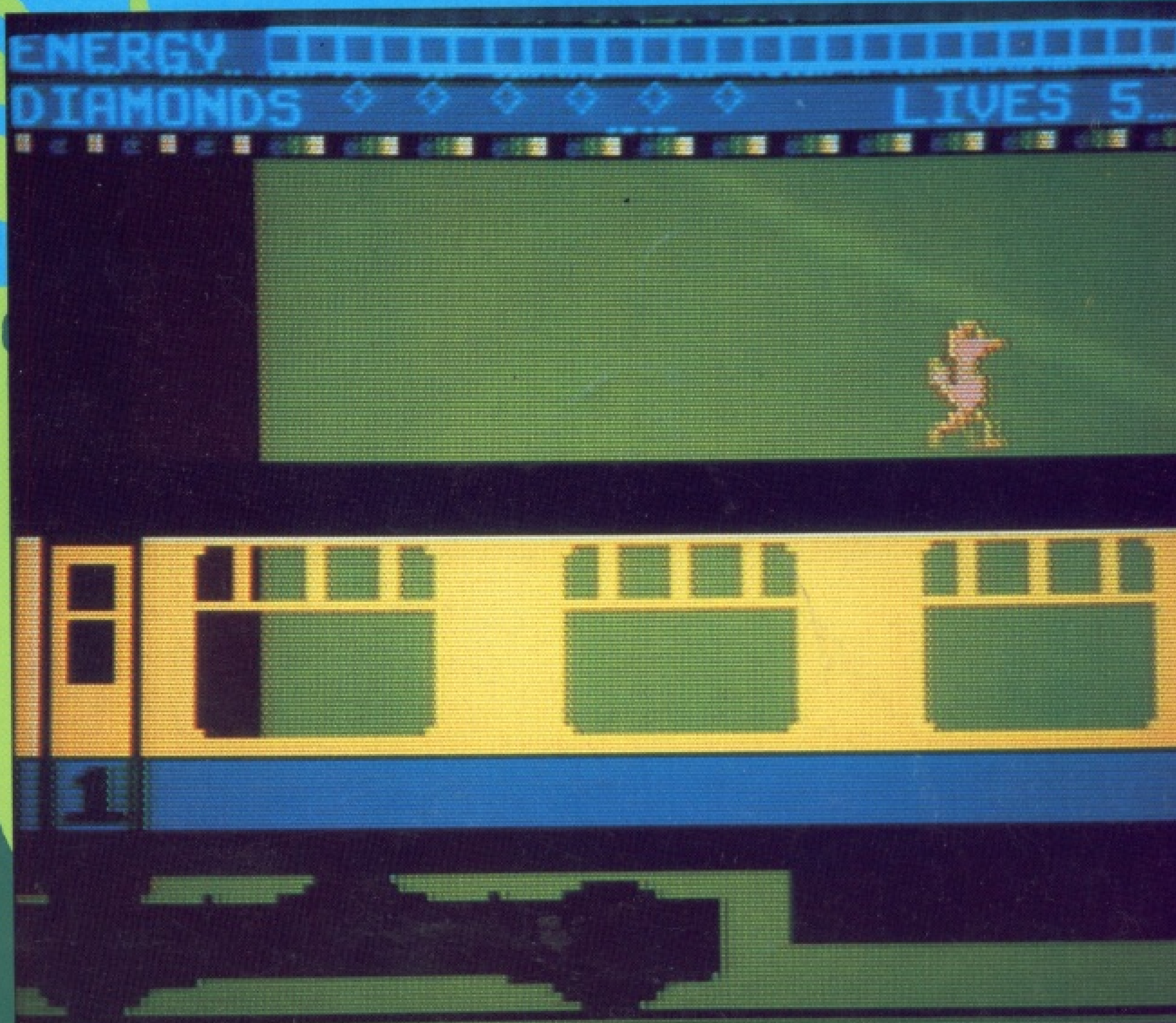
# Page 6 Atari Users Magazine

Issue 21
£1



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*Utilities Reviewed*
*DEGAS to NEO Converter*

# PAGE 6 Atari Users Magazine

**May/June 1986**

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PAGE 6 is a user's magazine and relies entirely on readers' support in submitting articles and programs. The aim is to explore ATARI computing through the exchange of information and knowledge. We will endeavour to pay for articles and programs where appropriate and we hope that you will gain satisfaction from seeing your work published. In turn we hope that you will learn from articles submitted by other readers. All published material is eligible for awards in the Annual Readers' Poll and may receive additional Editorial awards as announced from time to time in the magazine.



## *SPECIAL REPORTS*



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# Editorial

## USER SUPPORT?

I think everybody would agree that Atari is now a totally different company from old but curiously there are some things which Atari seems to want to carry over. The 'old' Atari were renowned for their lack of support and concern for their customers and one would think that the present company would want to change that. Not so, it seems. Atari have recently announced its policy regarding the long awaited ROM upgrade to the ST. Anyone who bought a machine after 1st January will receive their upgrade free of charge but those who bought before 1st January will be charged £25. Now think about that for a while. The vast majority of people who bought machines before 1st January were people like you and me, who trusted the Atari name, who wanted to support Atari and most probably have been loyal to Atari for some time. If it wasn't for these people who bought the early ST's, Atari may well not have made it into 1986. So who deserves the rewards, those who trusted and supported or those who doubted and waited? Atari seem to think that those early purchasers are not so important. To add insult to injury, a batch of machines produced last autumn have a Glue chip which is not compatible with the ROMs so what do Atari do? Give you one free? No, they charge you £18 on top of the cost of the ROMs! That's appalling.

'Thanks for the support ..... suckers!'. Is that *really* what Jack is trying to say?

## THE SURVEY

Thought you might like to know a few details about the readership survey now that the long task of analysing it is complete. Firstly, equipment. Not surprisingly, the majority of you own an 800XL - over 57%, but a surprising number own more than one machine, 34% in fact! The old 800 has a healthy following of 22% whilst the 130XE, despite its lack of publicity, is coming up with 20%. 16% have 400's and 9% 600XL's but only 3% of readers have less than 48k memory. ST's? Very few at the time of the survey, but 26% say that they intend to buy one this year. Who says that the UK is a cassette based market? An amazing 75% have disk drives and 13% do not even own a cassette. Are you listening, software houses? Telecommunications are still not popular here with only 6% owning modems but a surprise is that 43% own printers!

Everyone knows the old adage that the Atari is just a games machine, right? Well, PAGE 6 readers are out to prove that wrong as the majority, 38%, use their machines for programming. Arcade games come second with 26% followed by Home Use with 15% and the rest fairly evenly divided. Overall though with main, secondary and other interests taken into account, there is a remarkably even spread of interest, but programming still comes a clear first. You are a dedicated lot too. 66% rate their Atari as their main leisure interest, with 32% indicating it as the secondary interest. In these days of wide ranging and easily available leisure interests, that is a testament to the attraction of Atari computing.

So how clever are you? 9% claim to be advanced programmers with the remainder split between 48% intermediate and 43% beginners. That's a lot of advanced programmers, how about some contributions? Finally, the actual readership. PAGE 6 sure gets passed around with as many as 12 people reading one copy in some cases! Overall the survey indicates a readership of just over 10,000 which, combined with the level of dedication, is highly respectable.

Conclusions? Well if everybody who actually *reads* PAGE 6 would subscribe and if each of those 'advanced' programmers would send in a program or article we would have no problem in bringing you a top quality *monthly* magazine! But then, these things don't normally happen. Or do they?

## NEW MACHINES

Announced at the Atari Show was a new word processing package based around the 130XE and prompted by the success of Amstrad in this field. Initially based on the 130XE with NLQ dot matrix printer, floppy disk, 80 column card and word processor, it will retail at £349. Later in the year Atari promise a brand new 8-bit product designed specifically for this market.

## HALLEY'S COMING?

From Firebird comes The Comet Game launched to coincide with the space probe Giotto's closest approach to Halley's comet. An arcade/strategy game in which you must save the Earth from the deadly effects of the comet's tail, it involves several levels and many difficulties, including repairing the coffee machine! Price is £7.95 for 48k or more Atari's.

## MORE FROM ARIOLASOFT

Ariolasoft have recently released Archon II with different battlegrounds for earth, water, air and fire and 12 different conjurable monsters. On disk only at £12.95.

Movie Maker is another 're-release' from Ariolasoft via Electronic Arts that has been around for a few years but was never easily available in this country. Movie Maker allows you to create fully animated cartoons, or movies, on your Atari and will give hours of fun. It comes on two disks with several demonstration movies included and retails at £16.95.



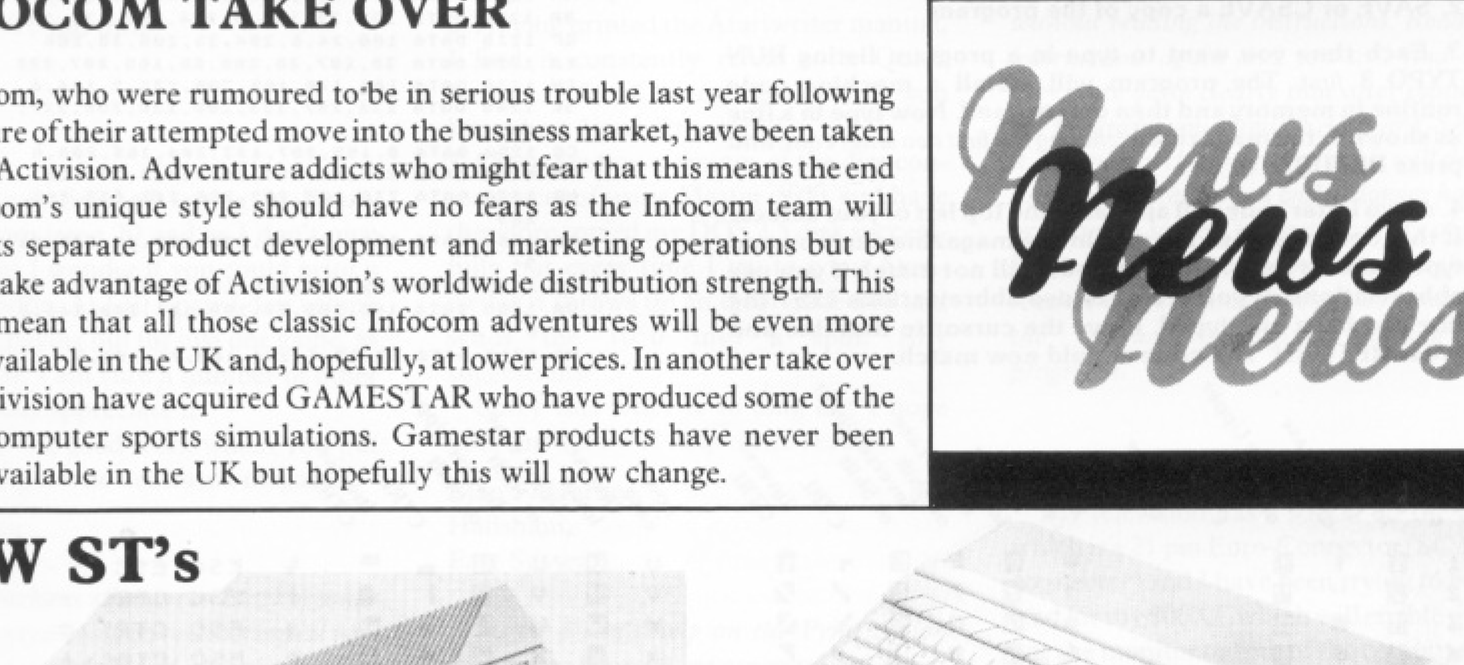

Also from Ariolasoft comes a new range of home productivity programs. The programs have in fact been available for some time on import but have been re-packaged and re-priced to represent excellent value for money. Two from Batteries Included are PaperClip, one of the mostly highly rated word processors for the Atari, which will retail at £44.95 and HomePak, a combined word Processor, database and communications package that will sell for £34.95. The third program comes from Electronic Arts and is another word processor retailing at £24.95.

## INFOCOM TAKE OVER

Infocom, who were rumoured to be in serious trouble last year following the failure of their attempted move into the business market, have been taken over by Activision. Adventure addicts who might fear that this means the end to Infocom's unique style should have no fears as the Infocom team will retain its separate product development and marketing operations but be able to take advantage of Activision's worldwide distribution strength. This should mean that all those classic Infocom adventures will be even more easily available in the UK and, hopefully, at lower prices. In another take over bid, Activision have acquired GAMESTAR who have produced some of the finest computer sports simulations. Gamestar products have never been easily available in the UK but hopefully this will now change.

News News

## NEW ST's



*Atari's replacements for the 520ST (so soon?) - see page 19 for details.*

# How to Type in the Listings and get them right!

The program listings in PAGE 6 are prepared carefully to ensure that they can be typed in as easily as possible. Before typing any listings ensure that you are familiar with the use of the Shift and CONTROL and INVERSE keys as outlined in your computer manual. The listings are prepared to match exactly what you see on screen. Every character that you may see in a listing is included in the chart below for cross reference. By using TYPO 3 you can ensure that you type in the programs EXACTLY as they are printed. Remember a single typing mistake may mean a program will not run.

## WHAT ARE THOSE CODES?

Each line of a program begins with a special two letter code. THESE SHOULD NOT BE TYPED IN. They are used by the program TYPO to check that you have typed each line correctly. IF YOU HAVE NOT ALREADY TYPED IN THE TYPO 3 LISTING PLEASE DO SO NOW. The program can be used as you type in each line of a program or to check an already typed program. The code for each line will match but if you have problems check the listing conventions below carefully, you are most probably typing a CONTROL character incorrectly. TYPO 3 cannot check if a line has been missed so if you have problems in running a listing count the lines in the program and ensure none are missing. If the TYPO codes match and the program still does not run, LIST it to cassette or disk using LIST "C:" or LIST "D:filename", switch off the computer, re-boot and then ENTER the program using ENTER "C:" or ENTER "D:filename". Save this version in the normal way.

## HOW TO USE TYPO 3

1. Type in the listing carefully for although you can use TYPO 3 to check itself (see 6 below) it may not work if you have made mistakes.

2. SAVE or CSAVE a copy of the program.

3. Each time you want to type in a program listing RUN TYPO 3 *first*. The program will install a machine code routine in memory and then delete itself. Now type in a line as shown in the magazine *excluding the first two letter code* and press RETURN.

4. A two letter code will appear at the top left of your screen. If this code matches the one in the magazine carry on and type the next line. Note, the code will not match if you use abbreviations. If you prefer to use abbreviations LIST the line you have just typed, move the cursor to that line and press RETURN. The code should now match.

5. If the code does not match, use the editing keys to correct the line and press RETURN again. Repeat if necessary until the codes match.

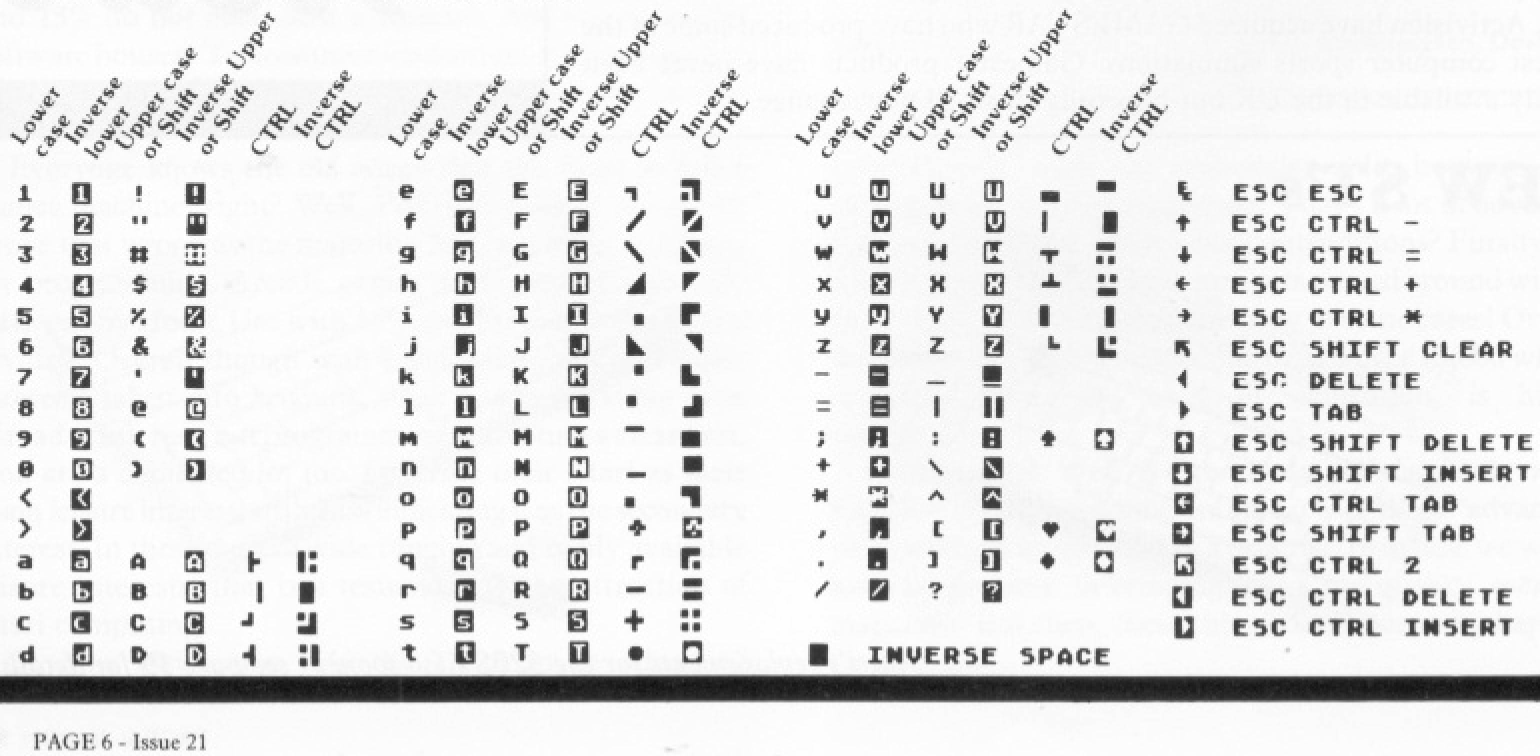
6. To check a line you have already typed LIST the line, place the cursor on that line and press RETURN.

7. When you have finished a listing just SAVE or CSAVE it in the normal way.

You can type in a program without using TYPO 3 and then check it by SAVEing or CSAVEing a copy of the program, running TYPO 3 and then LOADing or CLOADing your program and proceeding as in step 6 above.

Always SAVE or CSAVE a program before running it and always use TYPO before telling us that a program will not run.

```
EI 1 REM ********************************
AL 2 REM *  TYPO III by Alec Benson     *
         *           June 1985          *
SA 3 REM * A proofreader for ANTIC and  *
         *   PAGE 6 based on TYPO II    *
         * published by ANTIC magazine  *
EL 4 REM ********************************
SG 100 GRAPHICS 0
WG 110 FOR I=1536 TO 1791:READ A:CK=CK+A:
   POKE I,A:NEXT I
CG 120 IF CK<>30765 THEN ? "Error in DATA
    statements - Check Typing":END
YM 130 A=USR(1536)
VT 140 ? :? "TYPO III is up and running":
   NEW
MA 1000 DATA 104,160,0,185,26,3,201,69
HG 1010 DATA 240,8,200,200,200,192,36,208
QB 1020 DATA 242,96,200,169,79,153,26,3
RK 1030 DATA 200,169,6,153,26,3,162,0
RR 1040 DATA 189,0,228,157,79,6,232,224
TO 1050 DATA 15,208,245,169,93,141,83,6
KC 1060 DATA 169,6,141,84,6,173,4,228
EU 1070 DATA 105,0,141,95,6,173,5,228
BK 1080 DATA 105,0,141,96,6,169,0,162
KK 1090 DATA 3,149,203,202,16,251,96,0
ZR 1100 DATA 0,0,0,0,0,0,0,0
LD 1110 DATA 0,0,0,0,0,0,32,94
JM 1120 DATA 6,8,72,201,155,240,55,230
TV 1130 DATA 203,133,209,138,72,169,0,133
TW 1140 DATA 208,162,8,10,38,208,6,209
MF 1150 DATA 144,7,24,101,203,144,2,230
RL 1160 DATA 208,202,208,239,133,207,24,1
   65
TM 1170 DATA 204,101,207,133,204,165,205,
   101
AW 1180 DATA 208,133,205,165,206,105,0,13
   3
XH 1190 DATA 206,104,170,104,40,96,138,72
NR 1200 DATA 152,72,162,0,134,207,134,208
GF 1210 DATA 160,24,6,204,38,205,38,206
EA 1220 DATA 38,207,38,208,56,165,207,233
TM 1230 DATA 164,170,165,208,233,2,144,4
SK 1240 DATA 134,207,133,208,136,208,227,
   162
CB 1250 DATA 8,165,207,133,204,165,208,6
XN 1260 DATA 204,42,201,26,144,4,233,26
MB 1270 DATA 230,204,202,208,242,133,205,
   169
BC 1280 DATA 128,145,88,200,192,40,208,24
   9
WV 1290 DATA 165,204,105,160,160,3,145,88
QA 1300 DATA 165,205,24,105,161,200,145,8
   8
MQ 1310 DATA 32,69,6,104,168,76,153,6
```



# Readers write

Dear Les,

I have just upgraded from my old faithful 800 to a 130XE and XCII recorder. Unfortunately the 130XE died on me after a short while so I hooked up the XCII to my 800. For the benefit of others who may do likewise I would like to warn you of three fairly major problems I encountered.

Firstly, the tape counter runs off of the rewind spool so tapes with several programs on which were recorded on the 410 will not have the same digit counts. Secondly, the playback tones cannot be heard through the TV speaker and finally you must disconnect the XCII from the computer in order to get any sound from a program once it has loaded.

The last one had me puzzled for over two hours until I solved it so I hope this letter may help others in a similar spot.

A. Pullinger,
Brentwood, Essex

*I have not tried one of the new recorders yet but have one on order so I will test out these problems. The last one seems rather odd and if it happens on all 400/800 models could be a real pain in the neck for anyone whose old 410 has died.*

Dear Les,

I have just finished typing in Blockbreaker from issue 20 and as I don't own any paddles I wonder if you could print a joystick option. At £10 a pair I don't think it is worth paying out for just one game, as good as it is. I am sure a number of other people would appreciate it.

Keep up the good work which you put into running a true dedicated magazine.

Paul Barker

*Dave Hitchens who wrote Blockbreaker included a joystick routine in his initial version of the game but found it almost impossible to play so converted it to paddles. A great number of readers have asked so maybe Dave will let us have a joystick routine which we will gladly publish, with the proviso that it may be very difficult to play. In the meantime, if you want to play the game and don't have any paddles, try a Touch Tablet! It works to a degree although you might end up throwing away your touch tablet and buying some paddles!*

**Several readers have commented on the lack of a Letters page in recent issues, so we make amends by reintroducing Readers Write. If you have any interesting letters for publication please write to READERS WRITE, PAGE 6, P.O. BOX 54, STAFFORD, ST16 1DR.**

Dear Les,

Now that the prices have come down I have purchased a 1050 disk drive and 1029 printer hoping that all my problems would be solved. Of course this has not happened due partly to my own ignorance and partly to the appalling documentation that accompanies the hardware. For instance the 1029 comes with a free Atariwriter 'and manual' but nowhere does it say that the 'manual' is on the back of the disk!

Now for the problems.

1. The 1029 booklet say that if Print Menu shows 1027 as an option then it also fully supports The 1029 and to key in 6 as the option number. Well mine does show the 1027 but keying in 6 does nothing, I can only get it to print by keying in 1.
2. Having printed the Atariwriter manual, I find it constantly refers to a Quick Reference file. I haven't got one, do you know how I can get a copy?
3. I keep reading warnings of the dire consequences of using Master disks and have therefore copied my DOS 2.5 disk successfully but every time I try to copy Atariwriter it throws up an error code 144 and sends the 1050 into a spin. Any suggestions?

Sorry this letter is so long but I hope your answers will help other readers.

Alan F. Horner,
Hailsham,
East Sussex.

*Sorry, I can't help on the Print option problem as I don't have access to a 1029 but it does seem strange to use the 1027 mode as that printer cannot use many of the special functions of Atariwriter. The Quick Reference Guide came as a separate sheet with the original Atariwriter ROM. If it is not on the disk under QUICKREF, or something similar, I doubt if you will be able to get a copy. As regards the problem of copying the Atariwriter disk, it sounds as if Atari have copy protected the disk which seems rather odd for a program given away free. You probably can copy the disk with a copying utility but as you will have to buy one it rather takes away the benefit of 'free' software.*

*This letter highlights the desperate need of many owners for information on the 1029. If anyone can write a good definitive article on the 1029 or can provide a good, fast screen dump utility, we will publish it. With such a low price there are now thousands of 1029's about with very little support. Someone must know all about the 1029?*

Dear Sir,

Please could you tell me if it is possible to save your TYPO III to tape. I have tried three times to do so after typing it in and getting 'Typo is up and running', yet when I type CSAVE, although it appears to save nothing happens when I CLOAD.

A.Joyce,
Oakham, Rutland

*I am afraid you have highlighted the most common problem beginners have with magazine listings which 'won't run', you have gone ahead and run the program without reading the instructions. Read the instructions again and you will find that they state quite clearly that after typing in the program, you should SAVE or CSAVE it. If you run the program first it will delete itself and therefore you will no longer have a program to save! The vast majority of problems with listings would be avoided if only readers could contain themselves and read the instructions before running the programs.*

Dear Sir,

My television has a socket on the back which is a 21 pin Euro-Connector (SCART connector) and I have been trying to buy a lead for my 800XL which will enable me to use the monitor output of the computer on my television through the 21 pin connector.

Does anyone know where I can purchase such a lead?

R.Holmes,
Wolverhampton

*I am not even sure if this connection is possible. Usually a simple connection to a composite video and audio input will suffice. Does anyone know the answer?*

# 1ST ATARI COMPUTER

## Mark Hutchinson gives a personal view

After a long tiring journey to Hammersmith I was looking forward to a quiet conversation with Les Ellingham of PAGE 6, and renewing acquaintances from the PCW show last September. After all, the first day is bound to be a bit slack with lots of people at work or school. How wrong I was.

Coming into the main exhibition suite was like entering an oven. The place was packed. I never had a chance to speak to anyone. All I could do was wander around gazing at the stands and taking notes of where to visit later. Six o' clock came very soon and I was glad to get back to the hotel to rest my feet.

Saturday dawned bright and clear. I arrived a good hour before the show officially opened. This gave me time to meet old friends and introduce myself to some new ones. I also had a chance to look over the exhibition in peace.

The largest stand was, of course, taken by ATARI themselves. On display behind the glass were the full range of ST, 8-bit and, surprise surprise, two VCS units. The main interest was the 1040STF. 1024K, built in 1MB double sided drive, OS in ROM and built in power supply. With an SM124 monochrome monitor, ATARI's RRP is £919 (including VAT). "Power without the price" has become real power!

### BEHIND THE SCENES

Later in the day came a software vendor's meeting where the reason for the VCS units came to light. Again the ST was the talking point, but Sig Hartmann from ATARI went to great pains to emphasise that the company would be backing ALL models. The VCS had made a comeback and the 8-bit system was to be thoroughly supported. It was pointed out to the people present that, although they mainly write software for the ST, there is still a large market for 8-bit software and will be for the forseeable future. To prove that ATARI have faith in the XL/XE range they will introduce an 80 column card, 3.5" mini drives and mouse driven software.

Next followed a dissertation on the ST and the new 32 bit machine. The main topic in the media at present is networking (getting computers to talk to each other). ATARI are looking into this and work is progressing on various VT emulators. Also mentioned (and taken up at question time) was the future introduction of a graphics co-processor chip, the 'Blitter' chip, allowing graphics to run up to 6 times faster! And talking about speed, April is the expected date for Activision to launch a CD ROM player for $999.

There was also a talk about the 32 bit machine which will be using an M68000 family processor chip. This will be the even more powerful 68020 which has an instruction cache to allow small loops to run very fast. It can act as a co-processor, allowing the instruction set to be extended by additional chips; it includes an instruction for moving blocks of data between address spaces and a 32 bit external data bus. All this using UNIX!

### BACK TO THE SHOW

After the meeting it was back to the show where I was given a free copy of Micro Mart magazine. Whilst not 100% ATARI, it is a good medium for buying and selling second hand computer equipment. Just around the corner was the 'Red Rat' stand. They were showing some demo screens drawn with 'Technicolour Dream' (£12.95, disk or £9.95, tape), a drawing program that will let you use all 256 colours at once. Needless to say the demos were superb. A review of this program will appear soon. A follow up picture disk will soon be available for £3.95. Red Rat have obtained the rights for The Search, the graphic adventure game that you may remember advertised in PAGE 6 issue 4. They are also selling Shoot-Em-Up and Computer Command as one package, all in the budget price range of £5.95 (disk) and £3.95 (tape). Also on show was 'Screaming Wings'. Close by was an opportunity to upgrade the 520ST to 1 Megabyte for only £99.99, or 2.5 Megabyte for £400. Or you could have a 3.5" drive for only £99, all from AST.

For the ST programmer a host of languages was available, such as Megamax C, a full K&R implementation (£199) or if you care to wait for two months you could purchase their beginner's module. COBOL (£99), FORTRAN (£249), Fast/BASIC-M (£49), all from Philon. Fast Basic from Computer Concepts (£89.90). Modula-2 from TDI (£99) which, I have been informed, is the easiest step to ST programming for beginners to the ST and something I hope to look into very soon.

GST were showing GST C (£59.95) with its marvellous text editor which ST owners will recognise as First Word. Free with their C compiler is a fractal generator. This is based on a simple mathematical formula (you do not need to know any maths) that will create some stunning graphics. Later, perhaps May, GST will bring out First Word Plus, a combination of mailmerge (1ST Merge), spell checker and a graphics routine (Snapshot) which allows you to include pictures with your letters; worth waiting for. ANTIC magazine were displaying CAD-3D from Tom Hudson of ANALOG magazine, and Cartographer. It would have been nice to have had some demo screens to let you see these programs, but time did not permit.

### THE MOST VISITED STAND

To my mind, the most visited stand had to be Llamasoft. A practically permanent display of Colourspace was performed by Jeff Minter who made it all look so easy. I had never thought much about this program until I stood, encapsulated by a huge crowd, listening to 'Stairway to Heaven' and being entranced by the graphics from the hand of an expert.

I am sorry that much of this report is about the ST, but most of the stands involved ST products. If you did go for the 8-bit products you would not have been disappointed. There were bargains galore to be had. For instance, Eliminator or Sea Dragon at £1.99! I wanted to see what else was available at this stand but could not get through the crowds.

I met one or two PAGE 6 readers during the show and I hope my American friends write to me to let me know how the printer worked out. All in all, I had a great time. Tiring, but enjoyable. I look forward to being at the next ATARI exhibition where I hope to meet more readers (did I miss you Stan?).

# ER SHOW

First the verdict. An astonishing success with an attendance of over 14,000 that exceeded the Amstrad Show and surprised both Atari and Database Publications *and* virtually every other exhibitor. Some companies were overwhelmed by the attention they received and others such as Compumart must surely have set up world records! As a company renowned for discounted hardware they brought lot's of extra stock, enough for three days, and promptly sold it all on the first day! In fact they had sold over 60% a mere one hour after the Show had opened! You can be sure that there will be another Atari Show next year and there may even be something special later this year.

So now for the roundup. To be honest, the PAGE 6 stand was so busy that I probably saw less of the exhibition than any of the paying visitors but I grabbed half an hour late on Sunday and made a whirlwind tour picking up all I could find. I only wish that I had had the time to talk to some of the exhibitors but I am sure that what I did pick up will be of interest to all those who did not attend and act as a product reminder to those who did.

Despite what others may tell you, there were in fact more exhibitors in the 8-bit hall than in the ST hall although many were showing products for both machines. Let's start with the stand right in front of the main door. This was occupied by **COMPUMART**, a shrewd move, for as mentioned above the stand was virtually empty after the first day!

### THE ST HALL

This side was actually the ST hall so to the right was **HABA SYSTEMS** who had, to my mind, the most original and eye-catching of all the stands set up as a high class executive office with red and pine furniture. On show was the latest update of HabaWriter, HabaDex and HabaMerge and their 10 Mb Hard Disk. Also a pre-release version of a new database called Habaview together with some other American products to 'test the water'.

**KUMA COMPUTERS**, alongside, had their range of K-SPREAD, K-SEKA and K-RAM with details of other titles to come very shortly - K-COMM, K-GRAPH and others, all in newly styled, very smart packaging. **COMPUTER CONCEPTS** were previewing a new BASIC for the ST called FAST BASIC and were really testing the market for a launch later in the year. **MEGAMAX** were primarily showing MEGAMAX C stated by many to be the best C around and talked of an 'introductory' C package for beginners later in the year. Another C producer, **GST** were alongside with GST C reviewed in the last issue and a new FRACTALS program given free at the show to anyone buying a Compiler. **METACOMCO** are already well known to many ST owners for their early support of the ST and had three powerful programming languages available. These were MCC Assembler, MCC PASCAL and Lattice C. Also on their stand was TDI's Modula-2, a language rapidly being picked up by many new developers.

**PHILON UK** had a series of 'FAST' Compilers including BASIC-M, C and FORTRAN plus an introductory BASIC called HENRY's FUNDAMENTAL BASIC which acts as an introduction to the more advanced BASIC-M. **CASHLINK SOFTWARE** were demonstrating their CASHLINK ACCOUNTS along with a new package specifically for Hoteliers. CASHLINK has been around on other computers for several years and is highly regarded. It could be the ideal accounts program for the small businessman with a price less than half you would be charged for the same program on the IBM! **PROSPERO SOFTWARE** specialise in languages and had PRO FORTRAN-77 alongside PASCAL.

### THE 8-BIT HALL (with ST thrown in!)

Although there were many producers of ST software here there was plenty to interest 8-bit owners although it must be said that there was not a vast number of new products. Much interest centered on retailers who were discounting software right, left and centre and there were some incredible bargains to be had.

Let's round off the ST coverage first. **FIRST PUBLISHING** had, until they sold out, some of the ABACUS books on the ST which were remarkably comprehensive and, whilst obscure in places, would prove invaluable reference guides to those who wish to study the ST in depth but not necessarily to other users. **SUNSHINE BOOKS** had a couple of UK produced ST books and **MICRODEAL** nearby had a whole host of utilities and games for the ST licensed

## .... and Les Ellingham presents a round up

from Michtron in the U.S.A. but unfortunately I did not get the full details. **LLAMASOFT** showed COLOURSPACE for the ST all day, every day, with Jeff Minter giving continuous live shows to heavy rock music and very impressive it was too. COLOURSPACE on the ST is one step ahead again from the original Atari version and is the only program to put the computer in the same class as a musical instrument yet remain accessible to those who cannot play music. Definitely unique! **PSYGNOSIS** impressed more people with BRATTACAS and **LEVEL 9** apparently pre-viewed their first ST adventure, although I did not see it despite being on the stand next door!

One of the surprises of the show was the attendance of **ANTIC MAGAZINE** from the States who previewed some of their coming ANTIC CATALOG titles for both the ST and 8-bit machines. Coming from ANTIC for the ST are CAD-3D by Tom Hudson who wrote DEGAS which gives remarkable 3D drawing compatible with DEGAS, a game called RED ALERT, one of the first Expert Systems for the ST, EXPERT OPINION, a GEM based terminal program called FLASH and a program to create astrology charts which can be printed out. This is STAR STUCK. All sounds great, if only ANTIC could sort themselves out distribution wise and finally get these products to the UK.

### AND NOW (AT LAST) THE 8-BIT!

**RED RAT SOFTWARE** showed Technicolour Dream with some remarkable demo drawings just to prove that ST graphics have by no means killed off the 8-bit machines. They are also re-introducing some early games in a budget range as mentioned by Mark Hutchinson.

Other new products came from **D & M**

*continued overleaf*

## ATARI SHOW from page 9

**SOFTWARE** with SUPER 3D PLOTTER II, a very fast program for designing, rotating and scaling 3D objects. Although most people would use this just for fun, D & M claim that they have one customer who designs kitchen layouts with this program to show customers different views of their dream kitchen! Sounds good, it certainly looked good. **S.E.C.S** introduced the first of their new range of titles for the 8-bit machines with The Family Game, The Opera House and others. All at a budget price with many more titles promised. **CDS SOFTWARE** had STEVE DAVIS SNOOKER plus several budget titles from Blue Ribbon Software which were previously shown at PCW. **2-BIT SYSTEMS** brought along only enough of their SOUND SAMPLERs to cover their costs only to have them virtually snatched out of their hands! Another company who wished they had brought more with a product that caught everybody's imagination.

As I have said, most of the interest for 8-bit users was in the opportunity to see and buy software that they may have only read about or found elusive in the past and many visitors went away with bargain purchases. **SILICA SHOP** must have moved their entire shop to the show with a huge stand featuring just about every product you could think of and there were many discount suppliers and retail shops that I had never heard of selling both hardware and software.

Things are definitely looking up in the Atari World and you can be sure that all the exhibitors went away with tales of success which will surely encourage even more exhibitors for next year. I hope that this will give software developers the push they need to produce more for Atari and if any of the non-Atari distributors came along with their eyes open then I am sure we will see a great and continuing revival for Atari over the coming year.

P.S. I haven't mentioned the **PAGE 6** stand because you simply couldn't get near it!

# UPDATE

**ATARI SPEAKS (ISSUE 19):** A few errors crept into the article on building your own speech synthesiser. Many thanks to John Yeeles for the following information.

1. 14 PIN DIL Socket should be 8 PIN DIL
2. 3.7268 MHz CRYSTAL should be 3.2768 MHz
3. Polarity of C1 is not shown on Figure A +ve should be to the +5v line as the circuit diagram.

In addition, John suggests moving RV1 closer to the edge of the board to use it for mounting in a case.

**SECTOR 10 (ISSUE 19):** The boot program will not run from cassette with the listing as printed. Change some DATA in line 210. The 5th and 6th DATA statements which are currently 255,31 should be changed to 0,32.

**TWO C's (ISSUE 20):** The final two paragraphs on page 17 under the heading HIPPO C belong of course to the GST C review. I am sure most of you spotted but apologies to Matthew Jones and to all who are mightily confused!

**GRAPHICS WORKSHOP (ISSUE 20):** Several readers reported that the program would not run on certain machines even from the disk issue of the magazine. No problem with the listing is known but it appears that RAM must be clear for the display to appear properly. Make sure that you have not run another program beforehand.

**BLOCKBREAKER (ISSUE 20):** Several readers phoned or wrote to say that the joystick wouldn't work. Please read the intro, it doesn't use a joystick!

**If you find any bugs in the listings in PAGE 6 and have been able to solve them please write in with your solution, it may help us to help others.**

# NEWS

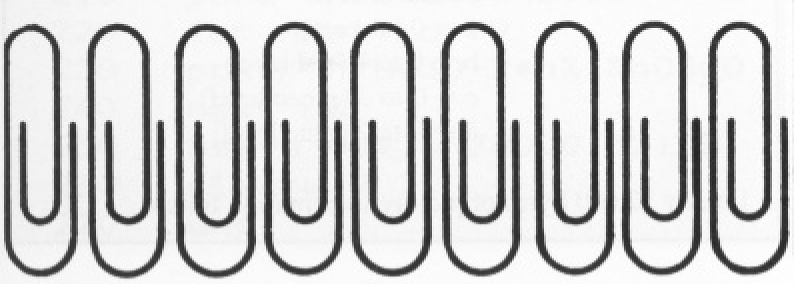
Prospero Software has announced the availability of **Pro Fortran-77** for the ST. Although primarily of interest to professional programmers and developers it is likely to prompt a new generation of software for the ST, Pro Fortran-77 will enable developers to recompile existing mini and mainframe software to run on the ST and should open up a whole new area of software such as CAD/CAM for the ST. For further details contact Andrew Lucas of Prospero on 01 741 8531.

New software from Mirrorsoft due later in the year - **BIGGLES** based on the film to be released this year.

Due to be released at the end of March, although seen only in demo form at the time of writing is a superb adventure called **The Pawn** from Firebird. From a graphics point of view, this is probably the finest graphics adventure to have been released for any home micro with 'pull down' pictures drawn with Neochrome of such detail that they will take your breath away!. No filled in line drawings or 'computer' style pictures on this one, what you have is a series of true paintings to illustrate various stages of the adventure. They tell me also that it has one of the most advanced parsers as well. It should retail at £34.95 and, if the demo is anything to go by, will be an essential buy for anyone interested in the 'state of the art'.

Already widely reported elsewhere are **Atari's new ST machines** launched at The Atari Show in March. The 1040ST has 1Mb of memory with a built in 1Mb drive and retails at £919 for a mono system or £1149 for colour. These prices are slightly higher than might have been expected but who knows what will happen when the Amiga is launched? The 'low end' machine is the 520STM which is the old 520ST with a TV modulator to allow it to run, in 40 columns only, on a normal TV. Strange beast this one. It retails at £399 but you will need a disk drive to use it for anything other than a straight telecommunications terminal which will set you back another £150 so it is not quite as cheap as it seems. Still add an Atari mono monitor for £150 and you have a £50 discount on the old (and now defunct) 520ST.

**DEGAS**, reviewed last issue, is now available through Ariolasoft (their review copy arrived just after the review of the 'imported' version had been written) at £39.95. Ariolasoft are 'delighted' at the response to their first ST product and so they should be for DEGAS is a fine program. Batteries Included promise more enhancements to the program which will hopefully come to the UK via Ariolasoft.



# BOOKS

## ATARI ST GEM Programmers Reference
## ATARI ST INTERNALS (The authoritative insiders guide)
**Published by Abacus Software**
**Distributed in U.K. by First Publishing**
**Reviewed by Matthew Jones**

ATARI ST INTERNALS and ATARI ST GEM Programmers Reference are the first two books to be published that claim to be 'technical' manuals, rather than guides to using the desktop et al. As such I bought them as soon as I saw them at the Atari User Show in London, hoping that I wasn't just buying a pair of lemons.

The introductory sections of each book, especially the GEM programmers guide tend to waffle on, and, in general, are somewhat inaccurate. Not too inaccurate, but enough to annoy. For example AES is said to stand for Application Environment System, whereas DRI, ATARI and the rest of the world understand it to mean Application Environment Services. Fortunately such trifling inaccuracies do not stop the 'meat' of the books being very good and useable. The GEM reference (414 pages) has three sections, the introduction (including a simple guide to C), the VDI calls and the AES calls. Ignore the introduction and you have a very good guide to GEM, with ST specific comments on many of the calls. For example, it says 'The Open Workstation function is not available on the ST and tends to crash' under the vopnwk() information. This sort of thing is invaluable information (and I am not being sarcastic) for ST programmers, and this is the first time it has been put in print. This book, like many other manuals, does not set out to teach you GEM from scratch, it will however teach you a lot, and is an excellent reference. If you want to use GEM in your programs, you need this book.

The ST Internals book (446 pages) covers the hardware and operating system side of the ST. The hardware side gives pin-outs of both the interface sockets and of all the major chips in the Atari. Basic technical explanations of all the various parts, including the sound chip and mouse are covered. The BIOS, XBIOS and GEMDOS calls are all covered with a fair amount of detail. Unfortunately no sample 'C' call is given with the GEMDOS information, but it can be worked out. The system variables are also listed, and these differ in some respects to the list given by Atari. It turns out that Atari are wrong, so I hope this bodes well for the accuracy of the rest of the book. I have described briefly just a few subjects covered by the book but there is also information covering just about every subject you could think of, and more.

Summing up this limited review, I would say that if you are intending to program the ST in a language other than BASIC or LOGO, you should have these books. You will find something in each which fits your requirements. These books are not lemons and will certainly bear fruit for programmers.

ST ST ST ST ST ST

# DEGAS ▶▶▶ NEO

## by Dave Keel and Steve Banks

Many ST owners who have managed to attach their computer to a colour monitor should by now have obtained a free copy of the Atari 'public domain' low resolution graphics design program, Neochrome. If not, stop reading this article, call your dealer and demand a copy NOW, it's excellent, probably better than anything you've used before ... and it's free!

A large proportion of those who have obtained Neochrome are also likely to have purchased a copy of Degas - a multi-mode graphics design program by Batteries Included. The many features of Degas include a first class font designer, very useable zoom, user designed fills and extensive shape drawing commands. Both programs are far better than anything possible on 8 bit machines, but both have their own individual benefits and weaknesses, and sadly there is a fundamental difference between the format of each program's saved screen that does not allow any compatibility between the two.

The DEGAS disk does contain a conversion program to enable Neo-Chrome screens to be converted to a DEGAS format, but there is no comparable program to allow conversion in the opposite direction. It is this conversion that has proved far more useful to the writer, for instance in producing a graphic outline and any text content using the full screen, zoom and text facilities of DEGAS, then convert and paint with Neo-Chrome making full use of that program's ease of colour selection with dynamic colour scrolling.

Close investigation of the two screen-formats revealed the information shown in the accompanying boxes and it was then decided to write the short conversion program listed here, in ST BASIC since this is the only language that is universally available to ST users at all levels.

The utility as listed is a very bare bones program with plenty of scope for expansion and improvement by readers, but which will also work perfectly well without any alteration. When the program is running don't move the mouse or it will show itself on the newly converted screen. Also remember that there is no error checking on filenames of the pictures to be converted, so make sure that you don't overwrite you original screen.

When running the program, you are asked for the file name of the DEGAS screen to be converted. Make sure it has the extension 'PI1' and when you are asked for the file name for the converted screen to be saved under, it should have the extension 'NEO'. Any colours selected from DEGAS (though remember it is far easier to select colours with NeoChrome!) are maintained throughout the conversion, but for safety's sake it is always best to carry out any conversions on a copy of your original screen. This program will, of course, only work with screens saved in the Low Resolution mode of DEGAS but the actual program can be typed and run in monochrome if it proves more convenient.

Type in the BASIC program listing and remember to save it before running. It is also advisable to have a disk available containing your DEGAS screen and more than 33,000 bytes free.

### NEOCHROME SCREENS

These are always 32,128 bytes long. 32,000 bytes are the actual screen RAM of the picture and the other 128 bytes contain information about the colour rotation pointers and colours. These bytes are at the head of the screen file and are best considered in terms of 16 bit words.

| | |
|---|---|
| Words 0 to 1 | colour rotation pointers(?) |
| Words 2 to 7 | colours in the form of $abcd where<br>a = 0 (always)<br>b = 0 to 7 (red level)<br>c = 0 to 7 (green level)<br>d = 0 to 7 (blue level) |

(i.e. 0070 = green, 0777 = white) - if this sounds familiar, think about the Control Panel!

| | |
|---|---|
| Words 18 to 23 | form a null file name of 8 spaces, a dot and three further spaces (i.e. 2020 2020 2020 2020 2E20 2020) |
| Word 24 | $801E (haven't a clue on this one?) |
| Words 25 to 63 | 0000 (likewise) |

Finally 32,000 bytes of picture information follow.

### DEGAS SCREENS

These are always 32,034 bytes long. 32,000 bytes are the actual screen RAM of the picture and the other 34 bytes contain information about the mode and colours. These bytes are at the head of the screen file and again are best considered in terms of 16 bit words.

| | |
|---|---|
| Word 0 | mode,<br>0000 1 = Low resolution (.PI1)<br>0001 = Medium resolution (.PI2)<br>0002 = High resolution (.PI3) |
| Words 1 to 16 | define colours, these are in the form of $abcd where<br>a = 0 (always)<br>b = 0 to 7 (red level)<br>c = 0 to 7 (green level)<br>d = 0 to 7 (blue level) |

Finally 32,000 bytes of picture information follow.

# Utilities Galore!

Among the early software for any computer is a host of utilities developed by programmers to help write their own software and then released to the public to help others program (and of course to make a bit of money!). The ST is no exception with a host of utilities already released. Here is a small selection.

## RAM DISK & PRINT SPOOLER from TALENT £24.95.

Another RAM Disk which is easily installed by transferring all the files on the disk to a TOS disk and booting up. It seems to work well but is spoiled by having to use the original as a key disk. A lot of hassle each time you boot up the system. The Print Spooler is installed as an accessory but there is little information about how to install it and use it. The manual or 'help' for the RAM disk is on the disk but I could not find any mention of the Print Spooler. It appears to be used only for printing files from the disk and for this it works well but a more useful Print Spooler would be one that could interact with all types of software. A couple of programs suitable for developers but not particularly for the average user.

```
List of \DEGNEO.BAS

 10     openw 2
 20     fullw 2
 30     clearw 2
 40     print "Converting from
 DEGAS to NEOCHROME."
 50     print
 60     input "Please enter file
 to be converted..",ip$
 70     input "Please enter the
 new filename..",op$
 80     bload ip$,&h7805e
 90     for n%=1 to 16
 100    word%=peek(&h7805e+2*n%)
 110    poke &h78002+2*n%,word%
 120    next n%
 130    poke &h78000,0
 140    poke &h78002,0
 150    poke &h78024,&h2020
 160    poke &h78026,&h2020
 170    poke &h78028,&h2020
 180    poke &h7802a,&h2020
 190    poke &h7802c,&h2e20
 200    poke &h7802e,&h2020
 210    poke &h78030,&h801e
 220    for n%=1 to 39
 230    poke &h78030+2*n%,&h0000
 240    next n%
 250    bsave op$,&h78000,32128
 260    clearw 2
 270    end
```

## DISK HELP from Microdeal. Price £29.95

A utility 'designed with the non-programmer in mind'! DISK HELP will help you check for errors on disks, repair damaged disks, salvage data from damaged disks and more. The program is easy to use and will help you to get the most life out of your disks. Damaged disks can be salvaged to various degrees and used again and you can read information from a disk, reformat it and write it back again. One interesting possibility for users with access to other computers is that files can be copied over from other systems, with Apricot given as an example. Naturally this is only useful for data or text files but it could be extremely handy. Disk Help is primarily a pruned down Utilities package designed to solve problems for those who don't know how to work things out for themselves, but if you are indeed a 'non-programmer' what do you do next when told 'Track number 12 is faulty - it has 4 bad sectors on it'?

## UTILITIES from Microdeal. Price £39.95

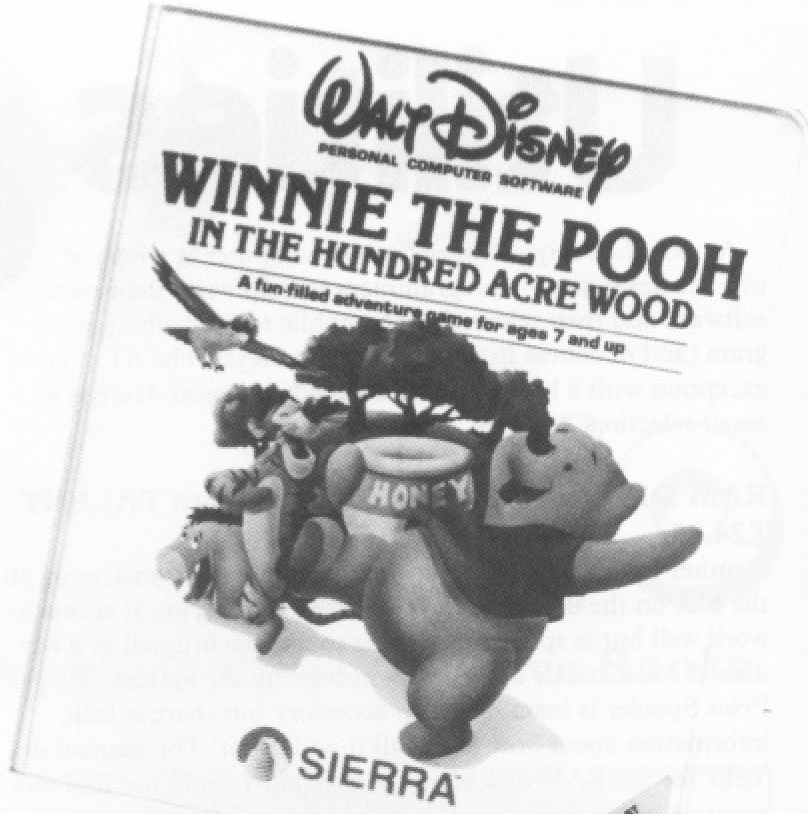
A much more advanced utilities program which will enable you to read and change any byte of information anywhere on your floppy or hard disks. As well as giving all the facilities of Disk Help, you can restore deleted files, change file and volume names, change file attributes and format individual tracks plus a whole host more depending on your experience and imagination. The program is GEM based and works well with the mouse enabling you to simply point at a byte you wish to change and typing over the new information. Scroll bars are used to move through files being viewed on screen and to step through sectors.

A couple of pages in the manual describe how records are stored on the disk to get you started but you will require additional knowledge to use Utilities to the full. Several suggestions for use are given such as changing disk labels or folder names but other uses will depend on your experience. Even if you don't program professionally it can be fun to customise or 'personalise' your disks, as anyone who has used a sector editor on Atari 8-bit systems will testify, and Utilities will provide enjoyment to 'hackers' as well as a useful tool to programmers.

## M-COPY from Microdeal. Price £49.95

Aimed squarely at software producers who wish to duplicate disks in quantity, this seems a strange program to release to the general public. What it does is to read a program of up to 150K from a disk and then write that program, formatting only those tracks that are required, to as many other disks as you wish. Saves a lot of time and I am sure that there will be small software developers who could use it but how many? I can't really think how others would use this program. Even user groups who might want to copy public domain programs would find it too restrictive as it is not designed to copy full disks. And it is not intended for making 'back up' copies of other people's disks either, so don't buy it for that! Maybe it is just easier to make it available to everyone than try to seek out the developers who might find it useful. ●

# WINNIE THE POOH
## Sierra On-Line
## £34.95




There has always been a curious gap in the market for children's software with a fair amount of pre-school programs and a sprinkling of Secondary school material but very little for the 'middle years'. The reason is that it is probably a very difficult age group to write for with a delicate balance required between games or programs that are too simple and thus easily boring and those that are too difficult and thus easily boring! In the film world, the most successful company to produce children's films must be Walt Disney and Walt Disney and Sierra have combined their knowledge to produce Winnie The Pooh in The Hundred Acre Wood, a 'fun-filled adventure game for ages 7 and up'.

Winnie The Pooh runs on both monochrome and colour systems and uses the mouse almost exclusively so that it is very easy for a child to make his or her way through the game. The story is that 10 objects belonging to various characters in the Pooh books have been blown about by The Blustery Wind and scattered all over the Hundred Acre Wood. The task is to find each one of these objects and return them to their rightful owner, but first you will have to work out who that owner is! Each time the game is played different objects are used and are scattered in different places so no two games are the same. The Hundred Acre Wood is not over large and can thus be easily mapped out by older children but it is just as easy to wander around and chance on things, you will come to no harm.

At each location choices are given on screen of various possible actions such as direction movements or talking to characters or just 'thinking' or 'doing nothing'. Each response is just pointed to with the mouse and the button clicked to execute. Although this is very easy, children are encouraged to think throughout with simple logic puzzles to solve such as working out who the items belong to. If you are stuck you can go and visit Owl who will look at the object and give you a few clues! Other uses of logic come in how to put down objects when there is already something in that spot as only one object at a time can be in any one location. Quite easy for adults but a good problem for children to work out for themselves. There are frustrations too as you would expect from an adventure! Happily (and rightly) you cannot be killed but just when you think you are doing well Tigger may come along and 'bounce' you all over the wood making you lose whatever you were carrying, and occasionally The Mist will come down. You have to wander around waiting for the mist to clear and when it does who knows where you will be! Finally there is the Blustery Wind which, as well as blowing at the beginning of the game, may come back and blow all the objects about again, just when you thought you knew where they were!







The game is full of humour, some very corny, some very funny but all at a level which children will love. The pictures are excellent and there is sound with a couple of songs included. Games can be saved if required by older children or by parents of younger children, although you may be surprised at what young children can learn and cope with, but quite often a game can be completed in a couple of hours giving a nice sense of achievement. Although aimed at 7 years old and up it will provide a great deal of enjoyment for even younger children if played by a parent asking their child 'What shall we do now?' and thus it is an ideal game for all ages.

Overall the game is excellent, marrying together Sierra's skills at adventure writing with Walt Disney's understanding of children. A friend of mine who has a young daughter says she will play this for hours on end and she has previously found computers 'boring'. What better recommendation can you get?

*Winnie The Pooh is available from Software Express in Birmingham who kindly loaned the review copy.* •

# the software supplies company

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ST computers, other hardware, and peripherals are available at discount prices from us: please phone for latest prices and availability. These products are fully supported and guaranteed latest available versions. Local delivery or personal collection can be arranged in place of insured parcels / road delivery. The Atari 1040ST is now available as part of specially supported applications packages: please enquire.

| | | | |
|---|---|---|---|
| | | 520STM - AVAILABLE NOW - | £poa |
| 1040ST - AVAILABLE NOW - | £poa | SF354 | £140 |
| 520ST + SF354 + SM124 + software | £695 | SF314 | £185 |
| 520ST + SF354 + SC1224 + software | £930 | SM124 12" hi-res mono monitor | £140 |
| 520ST + SF314 + SM124 + software | £740 | SM1224 12" med-res colour monitor | £375 |
| 520ST + SF314 + SC1224 + software | £975 | Phillips CM8533 med.res.RGB + lead | £315 |

Delivery extra. Printers available also.

ATARI ST SOFTWARE LIST (March 86)

<> A Mind Forever Voyaging.... text only Infocom mega-adventure £40 (£45) £38
[] Alternate Reality - The City.....£tba
[] Administrator.....................£240
<> Amazon....adventure.....£43 (£46) £40
[] Andra...full word processor.......£tba
[] Appointmaster.....................£70
<> Boffin......full feature wp which can combine graphics with text...£95 (£99)
<> Borrowed Time.....................£47
<> BOS BUSINESS SYSTEM....details + £poa
<> Brataccus...class adventure £32 (£35)
<> Cash Trader......easy to use accounts program £115 (with Analyser £150)
<> CashLink Accounts.....integrated professional accounts...£315 (£339) £300
[] Chat..............................£tba
<> Colourspace........spectacular 'light synthesiser' effects...£20
[] Comal 80..........................£tba
<> Crimson Crown...........£35 (£40) £33
<> Cutthroats..............£35 (£40) £33
[] CAD-3D....full 3D GEM-based modelling station with possible animation...£tba
[] COLR Object Editor..........£32 (£35)
<> Datamate..........................£55
<> Datastate 2.......................£350
<> Deadline...Infocom adventure...£19.95
<> DEGAS.........design & entertainments graphic arts system...£38 (£40) £35
<> Delta Patrol...................£24.95
<> Desk Diary..time management £55 (£60)
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[] Disk Doctor...as.below.......£28 (£30)
<> Disk Help...simple to use file repair and data recovery utility...£29.95
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<> Dragon 4x FORTH -Level 2..£140 (£150)
<> Dragon FORTH Accelerator....£70 (£75)
<> Dragonworld...adventure.....£42 (£46)
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<> Enchanter..adventure £35 (£40) £32.50
[] Expert Opinion......expert system for problem solving, 500 rule...£tba
<> Express Letter Processor £47.50 (£50)
<> Fahrenheit 451..adventure...£42 (£46)
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[] Fleet Street Editor..............£tba
<> Flip Side......version of the popular board game Reversi...£19.95
[] Forbidden Guest...................£35
[] Gateway...........................£35
<> GST C Compiler...compiler, assembler, linker, editor, shell...£55 (£60)
<> GST Fractal Generator......full C and assembler source code...£19.95
<> GST Macro Assembler..........Motorola compatible, fast throughput...£37 (£40)
<> Haba Business Letters..........letter outlines for business...£40
<> Haba Checkminder......cheque and home accounts system...£65
<> HabaDex......phone records processing system, fixed format...£55 (£60) £50
<> HabaMerge.......enables data transfer from Dex and Writer...£38 (£40)
<> HabaWills...will processor! £40 (£43)
<> HabaWriter..easy wp......£65 (£75) £60
<> Hacker...hugely successful game...£43
<> Henry's Fundamental BASIC...subset of FAST/BASIC-M...£53 (£56) £50
<> Hex...Cuthbert type game.......£37.95
<> Hippo Almanac -35,000 trivial answers to unknown questions...£33 (£35)
<> Hippo Backgammon............£35 (£40)
[] Hippo Concept.......'ideas' processor working on branching principle...£tba
[] Hippo Pixel..........design, edit and customise your pix and characters...£tba
<> Hippo Simple...database.....£35 (£40)
<> Haba Hippo-C.......K&R compiler suite used in UNIX-like manner...£70 (£75) £65
<> Hitchhikers Guide To The Galaxy...the meaning of life, 42, et al...£24.95
<> HiSoft Devpac ST.........highly rated assembler package...£47 (£50)
[] HiSoft Pascal ST..................£tba
[] Home Planetarium............£47 (£50)
[] Hotelier...complete system: accounts, billing, menu-writing, wp...£poa
<> H&D Base..........................£93
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<> H&D Toolbox Vol 1 -file/sector editor format/copy, recover...£28 (£30)
<> Infidel.............text-only Infocom adventure...£40 (£45) £38
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# REVIEW

# LATTICE C

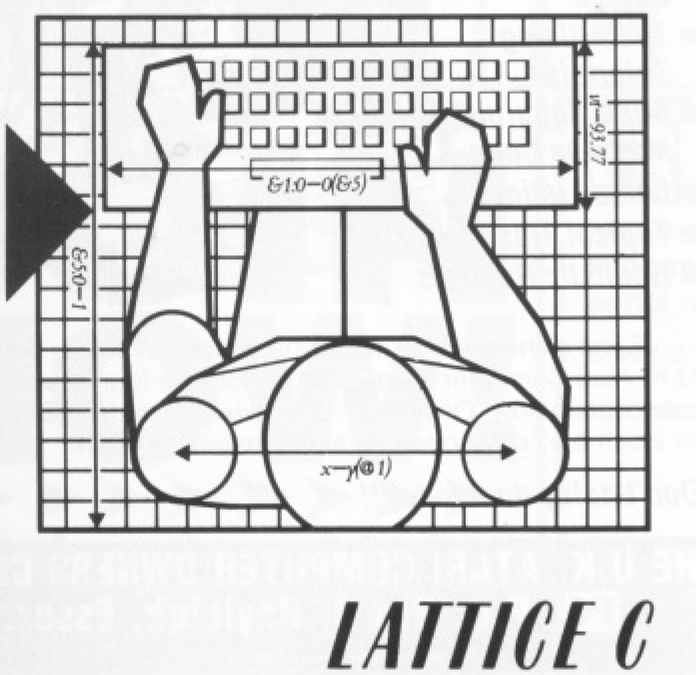
**reviewed by Matthew Jones**

Independent Software Vendors (ISVs) who bought the Atari development package will never be given an bug free update of the software. That's official. And it's not good news for those struggling with the DRI compiler's 'idiosyncrasies'. So when Metacomco announced that they were to produce a version of the Lattice C compiler, a compiler that has proved popular on other machines, many programmers looked forward to it arriving. It is now here, and I have been giving it a good test, compiling over half a megabyte of source code with it. It has not exactly been trouble free, but it is smoothing out.

## THE COMPILER

Lattice C is a very complete compiler, conforming very tightly to the K&R specification (see last issue for details), and giving the option of various useful extensions. The variations from K&R are so slight that you have to be very specialized to notice, but the extras include nested comments (useful for commenting out large blocks of code), character constants can be defined in hexadecimal (i.e. not only octal like '/40', but '/0x20' too), the searching of up to four other (non-default) directories (paths for #include files, an optional 'post-pre-processor' file creation (a debugging aid) and the ability to create either .O or .BIN binary files for the DRI LINK68 or GST LINK linkers respectively (the latter is supplied in the package).

One problem with the Lattice compiler is that the command line to start it (it is a .TTP file) is very long, and it is therefore easy to make mistakes when you are typing it in for the fiftieth time at three in the morning. (Hint: use a batch file.) Metacomco are working on a GEM based 'command shell' similar to that of GSTs that I reviewed in the last issue. This should help somewhat, though a better editor than the ED program (reviewed in issue 19) supplied may be needed to complete the package. Until such time as it is available (it is about to be Beta tested as I write), you must work from the desktop.



LATTICE C

## THE LIBRARIES

The standard library supplied in the package has all the usual functions, and includes floating point maths and BIOS, XBIOS and GEMDOS trap functions. The first release had a disastrous bug which meant that few of the GEM calls operated correctly. Metacomco soon realised this and fixed it, and this is where I found one of the advantages of Lattice C over some others - the producers are English. This has meant that when I have had a problem that boils down to the compiler I can ask them for help. (I do not however wish to encourage you to contact software houses every time you have a problem as if everyone did so they would never get any more programming done. If you do have a problem, check it very thoroughly first and read ALL the manual twice. Only then should you write to them with as much relevant detail as possible, perhaps including a disk with all your files on it. If you waste their time they will not be keen to help when you really DO have a problem.)

A GEM library with all the VDI and AES calls is provided. The problem I found with this is that the five GEM arrays through which parameters are passed are not actually globally available, but are defined in the library. This means you cannot set them up yourself and then call GEM, you must always use the standard calls. This may be good for keeping to standards, but it will cause problems for a few more advanced programmers.

## THE LINKER

Lattice C is supplied with the linker produced by another British company, GST. The linker is needed to convert the binary files produced by the compiler into executable programs after linking in functions used from the libraries. This is quite easy to use, but again can have a fair sized command line. I did find one slight area of incompatibility between the compiler and linker that was not warned about in the manual. It occurs as the result of a typing error in a source file. If you mistype a function name by changing the case of a character, i.e. printf() and Printf(), the compiler, which is case dependant, creates two separate references. The linker considers them the same though and considers the double reference as an error, giving a vague 'error in binary file' message. Tracking down the offending line is a slow process.

## THE MANUAL

The manual is a thick book packed with all the reference information you will need and more. Explanation of how to use the editor, compiler and linker, comparison to K&R C,

*continued overleaf*

Lattice C continued from page 19

full standard library function descriptions, an explanation of the 68000 implementation, how the compiler optimises certain things, run-time program structure, full error message explanations, some example programs, and a standard and GEM function list are all included. Again, this is not a tutorial, but a reference manual, and most users will not understand everything they read at first. As with all such things, experiments will teach you much, and once experience is gained, a re-read of the manual will reveal much more understanding. While generally very good, the manual does have a few deficiencies. First, the message which explains the 'error in binary file' problem is missing a line. As well as being awkward for my problem, it could be an indicator for other errors with text missing (I did not read them all!). Also the simple listing of the library functions is very misleading, having things like 'peek()' 'poke()' and 'int86()'. In C there is no peek or poke, and int86 and others are there from the 8086 version of Lattice. The detailed descriptions do reflect the libraries so a check can be made. The implementation details are very useful, especially as it reveals that the 'int' size is 32 bits (most others use 16 on the Atari - this is where the WORD LONG BYTE portability macros come in...). Also revealed is the fact that 32 bits are always passed on the stack for each parameter of a function, regardless of the parameter size. This means that even if you only pass an eight bit byte (e.g. 'putch('a');'), 32 bits will still be passed. This would normally be insignificant as the translation is done automatically. GEM, TOS, and any other system calls you can find all expect only 16 bits, and so an interface (the library calls) must be used. Again this is something only the more advanced will notice the effects of.

## CONCLUSION

To conclude, Lattice C will satisfy the demands of both novice and professional programmers. It may not be quite as friendly as the more limited GST compiler, but its full capability will probably make up for it. If you want a full C, this will give you a good one.

## EXTRAS REQUIRED

The problem that many programmers, professional or not, will have is that to use GEM fully, a resource and icon editor is needed to build the menus, dialogs and such like. Both GST and Lattice lack these so you must buy them separately. Not so much of a problem until you realise that only one has been available since the ST was launched, the Digital Research version which has bugs. The first alternative to come out will be that supplied with Megamax C (which should be out by the time you read this - review coming soon). This will take away many purchasers of the British Cs. I personally hope a cheap Resource Construction Set is brought out shortly to complement the UK software (GST are 'thinking' of doing one).

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# Revenger

by Paul Lay

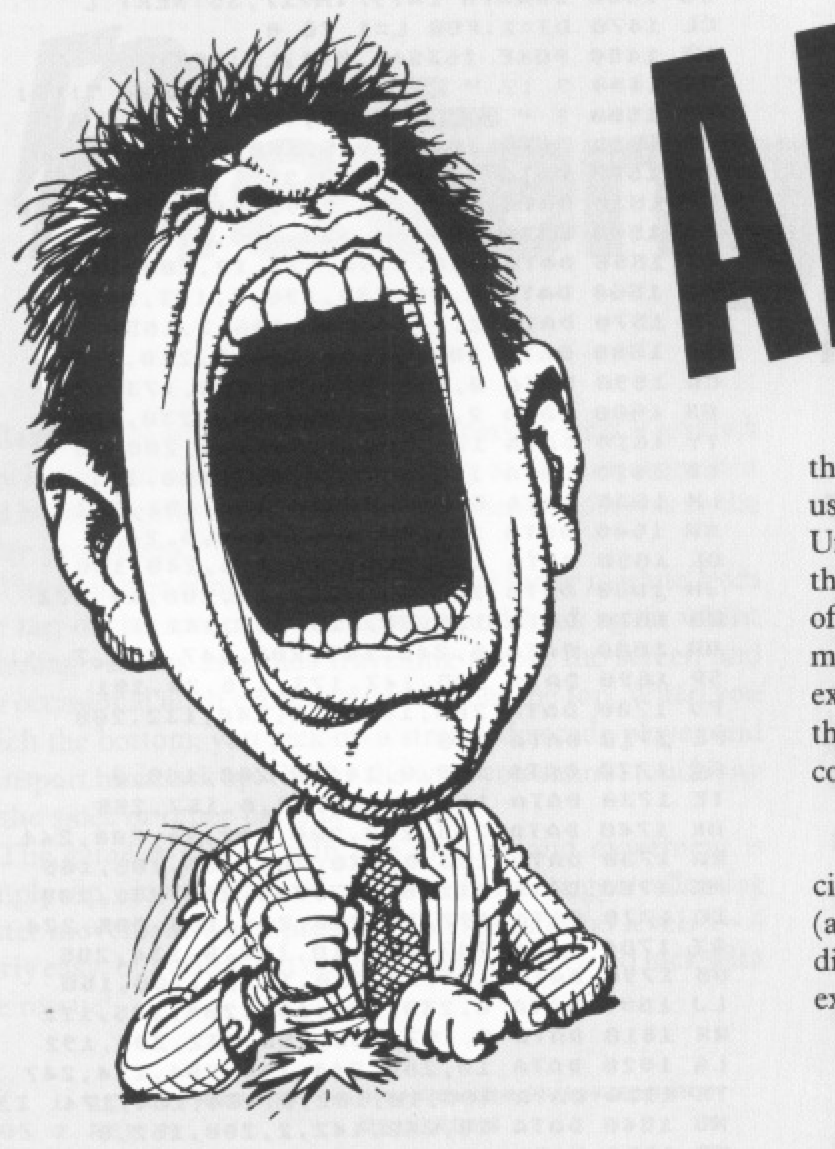
Revenger is an arcade style game played with a joystick which will suit all abilities. Whilst easy at the initial levels it will become quite a challenge for experienced players as the game progresses.

The object is simply to travel in your lunar module from the top of the screen to the bottom and back again whilst avoiding various asteroids travelling across the screen and the occasional alien dropping down from the top. When you reach the bottom, you pick up a stranded arcade player and transport him back up. Oh, by the way, you cannot touch any of the sides or other parts of the grid.

The game is played with one joystick and movement is simply up, down, left and right with the trigger allowing faster movement when pressed. You should find levels 1 - 4 fairly easy, but watch out on level 5 onwards! Good luck with the rescue!

```
EI 1 REM ********************************
VS 2 REM *            REVENGER          *
RQ 3 REM *               by             *
QX 4 REM *            PAUL LAY          *
EC 5 REM * ---------------------------- *
IZ 6 REM *  PAGE 6 MAGAZINE - ENGLAND   *
EO 7 REM ********************************
NN 8 REM
AC 10 GRAPHICS 18:HISC=0:POSITION 4,3
WV 20 ? #6;"INITIALISING":GOSUB 910
HN 30 FOR L=0 TO 2:POKE 53256+L,0:NEXT L
BZ 40 GRAPHICS 1:POKE 752,1
TG 50 POSITION 6,2:? #6;"revenger"
UE 60 COLOR 42:PLOT 5,6:DRAWTO 14,6
II 70 DRAWTO 14,10:DRAWTO 5,10:DRAWTO 5,6
UM 80 ? "          BY PAUL C.LAY":?
AK 90 ? "  SELECT  TO CHANGE DIFFICULTY"
UT 100 ? "        START  TO BEGIN";:D=1
UR 110 POSITION 7,8:GOSUB 110+10*D:GOTO 1
   50
AK 120 ? #6;" EASY ":RETURN
RY 130 ? #6;"MEDIUM":RETURN
PH 140 ? #6;" HARD ":RETURN
BJ 150 IF PEEK(53279)=6 THEN 200
VX 160 IF PEEK(53279)<>5 THEN 150
HY 170 D=D+1:IF D>3 THEN D=1
SI 180 FOR L=50 TO 0 STEP -1
JX 190 SOUND 0,L,10,10:NEXT L:GOTO 110
IS 200 POKE 53259,D-1+(D=3)
QN 210 SC=0:LE=1:LI=5
XM 220 GOSUB 1040:GRAPHICS 18:POSITION 6,
   3
AK 230 ? #6;"PREPARE":POSITION 8,5
XZ 240 ? #6;"FOR":POSITION 6,7
GX 250 ? #6;"LEVEL ";LE
VH 260 FOR L=1 TO 3:POKE 712,0:POKE 708,1
   4
MG 270 SOUND 0,100,10,14:FOR L2=1 TO 200
PN 280 NEXT L2:POKE 712,14:POKE 708,0
MX 290 SOUND 0,200,10,14:FOR L2=1 TO 200
GW 300 NEXT L2:NEXT L:SOUND 0,0,0,0
ZC 310 GOSUB 1200:POKE 512,132:POKE 513,6
XU 320 POKE 1537,124:POKE 1544,17
TM 330 POKE 53277,3:POKE 559,62
ZR 340 I$(5)=CHR$(0):I$(7)=CHR$(6)
VE 350 POKE 205,128:POKE 53250,150
QR 360 POKE 204,0:L=USR(ADR(I$))
YZ 370 POKE 54286,192:SOUND 0,0,12,10
XY 380 SOUND 1,244,10,8:SOUND 2,245,10,8
QV 390 POKE 623,1:POKE 53278,0:L=USR(ADR(
   J$)):POKE 623,4
ZO 400 IF PEEK(53252)=4 AND PEEK(53260)=0
    THEN 590
XM 410 FOR L=0 TO 2:SOUND L,0,0,0:NEXT L
VE 420 FOR L=255 TO 0 STEP -20
US 430 FOR L2=0 TO 7:POKE 1636+L2,255*RND
   (1)
NV 440 SOUND 0,L+3*L2,8,10:NEXT L2
GL 450 POKE 712,16*INT(13*RND(1))+32-L/20
   :NEXT L
YR 460 SOUND 0,0,0,0:LI=LI-1
LP 470 FOR L=0 TO 3:POKE 704+L,0:NEXT L
TW 480 I$(5)=CHR$(95):I$(7)=CHR$(228)
GP 490 L=USR(ADR(I$)):GRAPHICS 1
RW 500 FOR L=0 TO 3:POKE 53248+L,0:NEXT L
SG 510 IF LI>0 THEN 220
SB 520 POSITION 5,2:? #6;"game over"
AN 530 POSITION 2,7:? #6;"YOUR SCORE >";S
   C
UR 540 IF SC>HISC THEN HISC=SC
HW 550 POSITION 2,9:? #6;"HIGH SCORE >";H
   ISC
EY 560 ? "             PRESS  START";
DM 570 IF PEEK(53279)<>6 THEN 570
RA 580 GOTO 40
UQ 590 IF DI=1 THEN 730
VP 600 IF PEEK(1544)>=191 THEN POKE 1544,
   191:GOTO 390
XO 610 FOR L=0 TO 2:SOUND L,0,0,0:NEXT L
XX 620 POKE 1537,124:POKE 1544,17
WZ 630 POKE 705,0:POKE 706,0:FOR L=1 TO 8
RZ 640 POKE 1635+L,S(3,L):FOR L2=100 TO 1
   10
ST 650 SOUND 0,L2,10,L2/10:NEXT L2:NEXT L
RW 660 SOUND 0,0,0,0:FOR L=1 TO 15
JI 670 POKE 1637,24:POKE 1638,0
DH 680 POKE 1639,124:FOR L2=1 TO 20
TQ 690 NEXT L2:POKE 1637,88:POKE 1638,64
OL 700 POKE 1639,60:FOR L2=1 TO 20
TN 710 NEXT L2:NEXT L:SC=SC+10:LE=LE+1
PT 720 GOTO 470
OT 730 IF PEEK(1544)<17 THEN POKE 1544,17
   :GOTO 390
YN 740 SOUND 0,0,0,0:POKE 705,0:POKE 706,
   0
GX 750 POKE 1537,124:POKE 1544,191
EC 760 FOR L=1 TO 8:POKE 1635+L,S(3,L)
MM 770 FOR L2=100 TO 110
TA 780 SOUND 0,L2,10,L2/10:NEXT L2:NEXT L
```

```
SD 790 SOUND 0,0,0,0:FOR L=1 TO 15
IW 800 POKE 1637,24:POKE 1638,0
CV 810 POKE 1639,124:FOR L2=1 TO 20
TE 820 NEXT L2:POKE 1637,88:POKE 1638,64
OS 830 POKE 1639,60:FOR L2=1 TO 20
SN 840 NEXT L2:NEXT L:FOR L=1 TO 8
RK 850 POKE 1635+L,S(2,L):FOR L2=100 TO 1
   10
SX 860 SOUND 0,L2,10,L2/10:NEXT L2:NEXT L
SX 870 SOUND 0,0,12,10:POKE 53249,0
DC 880 POKE 53250,255:POKE 705,26
VC 890 POKE 706,168:DI=2:SC=SC+10
ZQ 900 ? CHR$(156);" SCORE ";SC;" LIVE
   S ";LI;" LEVEL ";LE;:GOTO 390
CL 910 DIM I$(11),J$(127),S(3,8)
HU 920 T=0:FOR L=1 TO 11:READ C:T=T+C
MR 930 I$(L)=CHR$(C):NEXT L
VJ 940 IF T<>1055 THEN ? "** DATA ERROR I
   N LINES 1510-1520 **":STOP
JP 950 T=0:FOR L=1 TO 127:READ C:T=T+C
NC 960 J$(L)=CHR$(C):NEXT L
TR 970 IF T<>15488 THEN ? "** DATA ERROR
   IN LINES 1530-1710 **":STOP
OR 980 T=0:FOR L=1536 TO 1705:READ C
RM 990 T=T+C:POKE L,C:NEXT L
TX 1000 IF T<>24163 THEN ? "** DATA ERROR
    IN LINES 1720-1960 **":STOP
GY 1010 FOR L=1 TO 8:READ A,B,C
CJ 1020 S(1,L)=A:S(2,L)=B:S(3,L)=C:NEXT L
AI 1030 RETURN
WK 1040 GRAPHICS 8:POKE 559,0
EK 1050 P=PEEK(106)-16
PT 1060 POKE 1549,0:POKE 1550,P+4
ZX 1070 POKE 1567,0:POKE 1568,P+5
KO 1080 POKE 1601,0:POKE 1602,P+6
MB 1090 POKE 704,60:POKE 705,26
ZC 1100 POKE 706,168:POKE 707,52
AF 1110 POKE 54279,P:U=4*(6-LE)
XM 1120 IF LE>5 THEN U=4
WO 1130 FOR L=256*P+1836 TO 256*P+1983 ST
   EP U
DW 1140 POKE L,126:POKE L+1,129
CJ 1150 POKE L+2,129:POKE L+3,126:NEXT L
GU 1160 FOR L=0 TO 41
XI 1170 POKE 1706+L,255*RND(1)
ZZ 1180 POKE 1746+L,6+8*RND(1)+16*INT(15*
   RND(1))
IH 1190 NEXT L:RETURN
XS 1200 GRAPHICS 5:POKE 559,0:POKE 82,0
ZK 1210 D=PEEK(560)+256*PEEK(561)
FK 1220 POKE D-2,112:POKE D-1,68
ZK 1230 POKE D,0:POKE D+1,P:POKE D+2,132
CH 1240 POKE D+3,202:FOR L=D+6 TO D+44
TZ 1250 POKE L,138:NEXT L:D=D-2
TE 1260 HI=INT(D/256):LO=D-256*HI
IX 1270 POKE 560,LO:POKE 561,HI
GA 1280 POKE D+47,196:POKE D+50,132
OF 1290 FOR L=256*P TO 256*P+39
PP 1300 POKE L,10:NEXT L
MN 1310 FOR L=256*P+41 TO 256*P+78
WV 1320 POKE L,0:NEXT L
MS 1330 FOR L=18 TO 21:POKE 256*P+L,82
NC 1340 NEXT L:POKE 256*P+40,10:POKE 752,
   1
IU 1350 POKE 256*P+79,10:? CHR$(125);"*";
JR 1360 FOR L=1 TO 38:? " ";:NEXT L:? "*"
   ;
PF 1370 FOR L=1 TO 18:? "*";:NEXT L
FP 1380 FOR L=1 TO 4:? CHR$(18);:NEXT L
PL 1390 FOR L=1 TO 18:? "*";:NEXT L
AG 1400 POKE 559,34:COLOR 1:PLOT 24,10
JU 1410 DRAWTO 54,10:PLOT 0,0
VG 1420 DRAWTO 0,47:PLOT 79,0
KJ 1430 DRAWTO 79,47:M=LE
VL 1440 IF LE>7 THEN M=7
HU 1450 FOR L=1 TO M:PLOT L*79/(M+1),20
YO 1460 DRAWTO L*79/(M+1),35:NEXT L
CL 1470 DI=1:FOR L=1 TO 8
WF 1480 POKE 1635+L,S(1,L):NEXT L
PI 1490 ? :? " SCORE ";SC;" LIVES ";LI;
QP 1500 ? " LEVEL ";LE;:RETURN
QP 1510 DATA 104,169,6,160,0,162,6
MF 1520 DATA 32,92,228,96
ZO 1530 DATA 104,165,209,201,41,208,250
GR 1540 DATA 169,42,133,209,173,4,208
LJ 1550 DATA 240,1,96,173,12,208,240
WN 1560 DATA 1,96,238,196,2,173,196
TX 1570 DATA 2,9,18,141,196,2,165
IR 1580 DATA 205,41,63,141,0,210,169
CA 1590 DATA 0,133,77,133,208,173,132
GX 1600 DATA 2,208,2,230,208,230,208
YY 1610 DATA 173,120,2,201,14,208,13
LA 1620 DATA 173,8,6,56,229,208,141
LX 1630 DATA 8,6,240,183,208,181,201
NN 1640 DATA 13,208,13,173,8,6,24
OL 1650 DATA 101,208,141,8,6,240,166
JH 1660 DATA 208,164,201,11,208,13,173
KU 1670 DATA 1,6,56,229,208,141,1
QR 1680 DATA 6,240,149,208,147,201,7
SP 1690 DATA 208,143,173,1,6,24,101
FV 1700 DATA 208,141,1,6,240,132,208
FL 1710 DATA 130
GO 1720 DATA 169,0,141,0,208,160,0
TE 1730 DATA 162,0,185,96,6,157,255
HK 1740 DATA 255,232,200,192,16,208,244
RA 1750 DATA 160,0,230,205,166,205,185
MG 1760 DATA 112,6,157,255,255,232,200
IC 1770 DATA 192,10,208,244,166,205,224
RI 1780 DATA 247,208,10,162,0,134,205
OB 1790 DATA 174,10,210,142,1,208,160
LJ 1800 DATA 0,230,204,166,204,185,122
RX 1810 DATA 6,157,255,255,232,200,192
LG 1820 DATA 10,208,244,166,204,224,247
TX 1830 DATA 208,10,162,0,134,204,174
NJ 1840 DATA 10,210,142,2,208,162,0
VY 1850 DATA 134,209,76,95,228,0,0
ZE 1860 DATA 0,0,255,255,255,255,255
RR 1870 DATA 255,255,255,0,0,0,0
KK 1880 DATA 0,165,153,255,90,126,255
CL 1890 DATA 219,219,0,0,60,126,255
BU 1900 DATA 153,221,255,219,146,0,72
BW 1910 DATA 138,72,166,209,189,169,6
BL 1920 DATA 141,10,212,141,3,208,189
TI 1930 DATA 210,6,141,21,208,48,6
MM 1940 DATA 254,169,6,76,163,6,222
JU 1950 DATA 169,6,230,209,104,170,104
SI 1960 DATA 64,236
FC 1970 DATA 219,24,24,219,60,88,255,126,
   64
DL 1980 DATA 165,255,60,255,165,26,126,25
   5,26
PE 1990 DATA 60,219,24,24,219,36
```



# AARGHH!

## A Guide to Atari Error Codes

**by Steve Pedler**

As everyone should know, when an error occurs during the running of a BASIC program, a code is returned to the user indicating the type of error that has taken place. Unfortunately, you then have to look up the meaning of these codes in a manual, and the explanations are all too often very brief and written in a kind of Atarispeak which may be difficult if not impossible to interpret. A better explanation of these codes might not come amiss and I therefore present a guide to the meaning of ATARI Error codes, why they occur and how to avoid them.

In this guide I give the error codes followed by the 'official' name as found in the Atari BASIC Reference Manual (appendix B). Note that error names may vary between different publications (even Atari publications!) as may the explanations given.

For further information, see the following sources:

Atari BASIC Reference Manual (Atari Inc.)
Technical Rgference Notes (Atari Inc.)
DOS 3 Reference Manual (Atari Inc.)
Your Atari Computer (Osborne-McGraw Hill)
Revised Mapping the Atari (Compute! Books)

### Part 1 - Language specific errors.

Errors 2 - 21 only occur when a BASIC program is running. Other languages (e.g. the Assembler-Editor cartridge) also use these numbers, but have a completely different meaning. You should also note that errors occurring during the execution from BASIC of machine-language subroutines may generate error codes which bear no relation to the error which actually occurred.

### Error-1

There is in fact no 'error' 1 in Atari BASIC. The value 1 is returned by the operating system on successful completion of an input-output (I/O) operation. Quite properly, BASIC doesn't bother telling you this, but just gets on with the job.

### Error-2 Memory insufficient.

During the running of a program, BASIC maintains a series of pointers in RAM to keep track of memory usage. Two of these are MEMTOP (locations 741,742) and APPMHI (14,15). MEMTOP is a pointer to the top of free

memory. Above the location found in MEMTOP is the display list, and following that the screen RAM. The value in MEMTOP is moved up or down depending on the graphics mode selected, the greater the memory requirement for any mode, the lower is the value contained here. APPMHI is a pointer to the top of your BASIC program. Whenever a new line is added to the program, or when space is reserved for a string or array by the DIM statement, the value in APPMHI is increased. If, either during the typing in of a program or during a run, the value in APPMHI is greater than that in MEMTOP, error 2 is the result. (There is an exception - see error 147).

This error may also occur if RAMTOP (106), the pointer to the top of available memory, is moved down too far, since this will also cause MEMTOP to be lowered when the graphics mode is changed. This could occur during repeated runs of a program which deliberately lowers RAMTOP (e.g. during debugging). To avoid this, press Reset before re-running such a program.

### Error-3 Value error.

This is a common error which can be surprisingly difficult to track down. It occurs when attempting to use a number whose value is in some way unacceptable to the computer. Trying to POKE a memory location with a negative number or one greater than 255 will cause this problem. So too will trying to access part of a string or array with a negative index value, or if the second index is smaller than the first. For example, the following lines would generate this error:

```
10 DIM A$(9):? A$(7,1)
20 END
```

On the face of it this should be easily avoidable. However, frequently a program first computes the value of a variable then uses the variable in a POKE statement or as a string or array index. It is all too easy during the initial computation to obtain a value that is not acceptable to the machine. If the cause of this error is not clear, check the actual value of your variables against what you think they should be.

### Error-4 Too many variables.

Atari BASIC only allows you the use of 128 different variable names. In practice, this should be enough for most applications, so that you are unlikely to see this error. One point to beware of is that variables used during program development, but not in the final version, will remain in BASIC's variable name table even if no longer used in the program. If you are running short of variables, you can clear out the unwanted ones by LISTing your program to cassette or disk, typing NEW (which clears the variable name table) and ENTERing your program again.

Why does this limitation exist? When a BASIC program is present in memory (or SAVEd to cassette or disk) it is in tokenised form rather than full ATASCII format. Each BASIC keyword is stored as a one byte token, so that (for example) the word RESTORE is stored as one byte rather than seven (one for each character). Variables are also stored as tokens, so that no matter how long the variable name, it still only takes up one byte each time it occurs in the program. One byte can only contain 256 different numbers, the BASIC keywords are allocated numbers 0-127 (though not all are used) leaving the numbers 128-255 for the variables - giving 128 different names.

Should you need more than 128 variables, then you can store numeric variables as elements of an array. For example, the statement DIM ARRAY(99) will set up an array of 100 elements. Each of these elements can hold a different number, but the array still only takes up one variable name.

### Error-5 String length error.

Whenever you use a string, you must first tell the machine how long you want the string to be, using the DIM statement. BASIC then reserves a section of memory to contain the contents of your string. The convention used is that the first character of the string is given the index value 1 (i.e. PRINT A$(1,1) would print the first character of A$). If you use zero as an index, then error 5 occurs. Incidentally, note that just to be confusing, the first element of an array is given an index of zero!

This error will also occur if you use an index value greater than the dimensioned string length. If you need a longer string, you will have to alter the original DIM statement. Once again, it is easy to cause this error when using variables as string indices. See also errors 3 and 9.

### Error-6 Out of data error.

Whenever you use the READ statement, BASIC obediently tries to read as many items of DATA as you have instructed. Every time one piece of data is read, a pointer is updated to point to the next piece. If BASIC finds that there is no more data in the program, but it is still under orders to READ, then the run stops and error 6 is returned (but see below). This error is usually caused by miscounting the number of data items to be read (often by means of a FOR...NEXT loop) or by missing out one or more pieces of data. A slightly more obscure cause is that the pointer is not moved during a GOSUB...RETURN loop. If your subroutine reads data contained in lines which are part of the subroutine itself, and control then returns to the main program, when you next try to read data the pointer will be pointing to data lines following the subroutine (if any). To avoid this, you should make appropriate use of the RESTORE statement.

You can make use of this error in your programs. If you have large amounts of data to read in, then rather than count them all up, you simply set a TRAP to the line where the program is to continue when all DATA is read. You then set up a simple loop which forces BASIC to read data until there is none left, at which point error 6 occurs but is caught by the TRAP and the program then continues as normal.

### Error-7 Number greater than 32767.

Theoretically this error means that you have used a number greater than 32767 (hex $7FFF) where this is not acceptable to the machine. In practice, the only reason I

*continued overleaf*

know for this error is a line number larger than 32767 - and I'm not sure why this limit exists. Does anyone else have any further information?

If you try to type in a line with a line number of 32768 or more, you simply get a syntax error on pressing Return. However, Atari BASIC allows you to use variables as line numbers in statements such as GOTO, GOSUB etc. so look out for the possibility that the variable is larger than the allowed limit.

### Error-8 Input statement error.

When you issue an INPUT statement, BASIC expects the program to enter an appropriate reply, (either via the keyboard or from cassette or disk) which will either be a number or a character string. While it is quite acceptable to enter numbers in response to a string input request (the characters making up the number are treated just like any other string) it is not acceptable to enter a string when BASIC expects a number. This is because BASIC will try to assign the number which is input to a variable (e.g. if you respond with '450' to the statement 'INPUT A', the variable A gets the value 450). It clearly can't do this with a string of characters, and so will generate this error. Pressing Return without entering any number at all will also cause the error.

You can prevent users crashing your programs in this manner by setting a TRAP so that any input which generates an error could print a message and a request to try again.

### Error-9 Array or string DIM error.

There are three possible causes of this error.

i) As mentioned above, in Atari BASIC you must DIMension all strings or arrays before use. If this is not done, and you try to use an undimensioned string or array, this error results.

ii) You may also only dimension a string or array once per program run. A good practice would be to contain your initialization code (including setting up strings and arrays) in a separate subroutine called only once at the start of the program. This will prevent accidental redimension of your strings. Should you for some reason need to redimension strings or arrays during a program you must use the CLR statement to undimension them first.

iii) There is an absolute limitation of dimension size of 32767 for strings, and 5460 for arrays. Exceeding this limit will generate error 9. Different strings or arrays when combined may however exceed this limit, providing you don't exceed available memory, in which case you will get error 2. (The odd looking figure of 5460 for array size comes about because DIMensioning an array to this size sets up the array to hold 5461 elements. Since each element takes up six bytes, and 5461 x 6 = 32766, one more element would exceed the 32767 limit.)

### Error-10 Argument stack overflow.

As BASIC processes a program line, if it comes across an arithmetical expression it first places the various arithmetical operators it finds on an 'operator stack'. The order in which the operators go on the stack is of some importance, since it determines the order in which BASIC carries them out. In some cases the order depends on priority (multiplication has priority over addition, for example), otherwise on the order they occurred in the statement. This order can be specifically overidden by using parentheses. The size of the stack is limited. If the number of operators or the number of parentheses cause the stack size to be exceeded (stack overflow), error 10 is returned. If this occurs, you will have to simplify the offending expression.

### Error-11 Floating point overflow/underflow error.

BASIC stores numbers in your program in a 'floating point' format, using six bytes every time a number occurs. (It is clearly more economical of memory to assign a variable to a number if you intend to use that number frequently, since this will only use one byte every time it occurs.) By using this format, BASIC can utilise numbers as large as 10 to the power 98, or as small as 1 divided by 10 to power 99 (should be a good enough range for most purposes!). If you exceed these limits, then BASIC can't handle it, and this error results. The usual cause of this is inadvertantly dividing a number by zero (the theoretical result of which is infinity).

### Error-12 Line not found.

Certain keywords in BASIC are followed by a line number, e.g. GOTO, GOSUB, etc. When such a statement is processed, BASIC attempts to find the indicated line. If it can't do so, then it literally has nowhere to go, so the run stops and this error is returned.

There is an interesting feature here to do with the TRAP statement. If you set a trap to a nonexistent line number, and an error occurs to spring the trap, then instead of error 12, as you might expect, you get the error which sprung the trap in the first place. You can use this to clear previously set traps which are no longer wanted, by setting the trap to a line known not to exist (e.g. TRAP 40000).

### Error-13 No matching FOR statement.

On processing a FOR statement, BASIC puts 16 bytes into an area of memory called the run-time stack. This is in RAM, pointed to by locations 142 and 143, and is situated directly above the string/array area (itself just above the main body of the program). The first 12 bytes are the numerical limit the variable can reach then the step increase or decrease (six bytes per number in floating-point format). The remaining four bytes are the variable number as it occurs in the variable name table, the line number where the FOR occurs, and the offset into that line. When it reaches the corresponding NEXT, BASIC checks that the variable limit is not yet reached, and then returns to the line containing the FOR. Clearly, if BASIC finds a NEXT without a corresponding FOR, there is

nothing on the run-time stack to indicate the point of return, and program execution must stop.

GOSUB statements also use the run-time stack, placing four bytes on it. These are an identifier byte to indicate a GOSUB, the line number to go back to on reaching the RETURN statement, and the offset into that line. See the description of error 16.

This error also occurs if your FOR...NEXT loops have not been properly nested. If the variable in the NEXT statement is not the same as that in the FOR entry on the stack, then the same problem arises.

### Error-14 Line too long error.

When you type in a line of code and press Return, your line goes into BASIC's input buffer, 128 bytes located from 1408 to 1535 (580-5FF hex). BASIC then proceeds to tokenise the line (see error 4 above for an explanation of tokenising) and puts the resulting tokens into its output buffer, 256 bytes of RAM located above the value contained in MEMLO (743, 744). If the length of the tokenised line exceeds 256 bytes during the tokenising process, error 14 occurs. It's not very likely, but if it does happen you will have to shorten the line.

### Error-15 GOSUB or FOR line deleted.

This is a strange error which I have never actually seen in practice. You will remember (see error 13 above) that GOSUB and FOR statements use the run-time stack to indicate the line to which control should pass on reaching the RETURN or NEXT statement. This error means that on reaching a RETURN (or NEXT) BASIC fetches a line number from the run-time stack, but cannot then find that line. This in turn implies that the line was deleted between BASIC's encountering the GOSUB (or FOR) and the RETURN (or NEXT). It is difficult to think of circumstances in which this might occur, but it is possible that POKEing around in the area of RAM which contains the program might alter line numbers. Another possibility is faulty RAM, causing program lines to be lost.

### Error-16 RETURN error.

This error is analogous to error 13 above. On reaching a RETURN, BASIC gets the line number to return to (and the offset into that line) from the run-time stack. If a RETURN is reached before a GOSUB, there won't be an entry on the stack and program execution will have to stop.

### Error-17 Garbage error.

A very reassuring error message to get! What it means is that while executing the program, BASIC has come across a line which contains non-executable (garbage) code. There are several possible reasons. Although Atari BASIC performs syntax checking on entry of program lines, it is quite easy (especially if you are in a hurry) to miss the syntax error display you normally get. This erroneous line will however be entered into memory (at least in part), and when BASIC finds it again error 17 is the result. It is also likely that POKEing directly into the RAM containing your program would alter the code, causing havoc at run time. The third possibility (least likely of all) is that your RAM might be at fault.

### Error-18 Invalid string character.

This error relates to the use of the VAL function. Although numbers are usually held as constants or as numeric variables, it is possible to store numbers as strings. To convert a number to a string, you use the STR$ function. You can then perform string handling operations on the result. To convert the string back into a number for arithmetical operations, VAL is used. VAL can only be used however if the string is composed of numbers, or (at the least) if the first character of the string is a number. If this condition is not met, this error is generated.

### Error-19 LOAD program too long.

This error is a very simple one: it means that the program you are trying to LOAD is too large to fit into the available RAM. This is not likely to be seen with today's 48K-plus machines, but it must have been fairly common in the days of the 8K Ataris. There is no easy solution; if this happens, you will have to install some more memory in your computer. It is possible that this error might occur in a 48K machine with faulty RAM.

### Error-20 Device number error.

This error occurs during input/output operations if you try to use an incorrect IOCB (channel) number. (See error 134 in the second part of this article for a brief explanation of IOCBs.) The Atari can use up to eight IOCBs (numbered 0-7) for communication with peripherals, but BASIC reserves IOCB zero for its own use. The IOCB number is the number following the 'hash' sign in statements such as PRINT #6, OPEN #1, CLOSE #7, etc. and must be numbered from one to seven inclusive. See also error 134.

### Error-21 LOAD file error.

When you try to LOAD (or CLOAD) a program, the computer expects to receive a BASIC program in tokenised format (see error 4 for an explanation of tokenising). Tokenised BASIC programs are only stored on cassette or disk with the SAVE (or CSAVE) command, and files created by any other means will not be in this form. Trying to LOAD anything other than a tokenised BASIC program will produce error 21. Examples of such files would include any file LISTed to cassette or disk (full ATASCII format), machine language programs, screen memory dumps etc.

If this error occurs, you will have to use the correct command to reload your file. For example, this would be ENTER for LISTed files, the DOS binary load (option L) for machine code files, and so on.

***Next issue - Steve Pedler concludes this article with a comprehensive look at the Error codes associated with INPUT/OUTPUT and the Operating System.***

# DOING THE I

We all know that the Atari is an incredibly versatile machine but there are some tasks that most people believe it cannot do. I would like to take a couple of these 'impossible' tasks and prove that the Atari is even more versatile than you thought.

Everyone should know that display lists can be mixed *horizontally* by building a new display list but ask many experts if you can combine different graphics modes *vertically* across the screen and they will say it can't be done. The program GRAPHDEM here proves that it is possible to mix Graphics 8 and 9 in this way and there is no reason why you cannot amend it to include graphics 10 or 11.

## A CONSISTENT MODE

Both programs presented here use a graphics 8 screen as it is one of the most consistent graphics modes as far as DMA is concerned. In fact every scan line uses the same amount of DMA with the exception of the two lms scan lines. The first lms scan line is two machine cycles ahead of a normal scan line while the second is three cycles ahead. We have to take account of the differences in our timing loop. All graphics modes are, in fact, more consistent than text modes.

## GRAPHDEM

This program generates a screen consisting of a margin of Graphics 8 down the left hand side of the screen with the rest of the screen in Graphics 9. To add further variety, the normal 4 line Graphics 0 text window is retained. One use of this arrangement is the ability to draw graphs in 16 intensities neatly labelled with 40 column text.

The technique is performed by changing the GTIA selection in PRIOR ($D01B) at a particular point during every scan line. We end up with every scan line comprising32 pixels of Graphics 8 followed bythe rest of the screen in Graphics 9. We can access these from Basic by fooling the OS into thinking that we are in either Graphics 8 or 9 (subroutines GR8 and GR9) and then drawing to the relevant section of the screen.

The DLI used is provided in source form with this article and obviously by increasing or decreasing the delay between changes to PRIOR we may increase or decrease the proportions in which the screen is split between the two modes. Obvious other applications are graphs such as pie charts and so on whilst graphic adventures could be drawn in Graphics 9 with text or status information down the side in Graphics 8. There are many other applications where labelling is required.

One immediate question which arises is is whether it would be possible to do the same with ANTIC, that is , on a single scan line, change between ANTIC #E and ANTIC #F display mode. Unfortunately it doesn't look like this is possible as according to the Hardware Manuals, ANTIC's Display List Instruction Register (IR) cannot be directly accessed by the programmer.

```
EI 1 REM ******************************
XH 2 REM *     GRAPHICS 8/9 DEMO      *
LR 3 REM *          by               *
EX 4 REM *       PAUL LAY            *
EC 5 REM * -------------------------- *
IZ 6 REM * PAGE 6 MAGAZINE - ENGLAND *
EO 7 REM ******************************
TU 10 REM Machine Code For DLI
OU 20 DATA 72,138,72,152,72,169,0
VG 30 DATA 160,64,162,160,141,10,212
OU 40 DATA 141,27,208,224,160,240,1
QI 50 DATA 234,224,66,240,2,133,203
FA 60 DATA 133,203,234,234,234,234,140
BH 70 DATA 27,208,202,208,227,141,10
VO 80 DATA 212,141,27,208,104,168,104
YT 90 DATA 170,104,64
YL 100 FOR I=1536 TO 1587:READ J
KM 110 POKE I,J:NEXT I
ZC 120 REM Allow Access To GR.8 & GR.9
SB 130 GR8=150:GR9=170:GOTO 180
TV 140 REM ACCESS GR.8
EJ 150 POKE 87,8:RETURN
US 160 REM ACCESS GR.9
FA 170 POKE 87,9:RETURN
LS 180 GRAPHICS 8:POKE 752,1
WD 190 POKE 512,0:POKE 513,6
FM 200 DL=PEEK(560)+256*PEEK(561)
UT 210 POKE DL+2,PEEK(DL+2)+128
OI 220 POKE 54286,192
UO 230 REM Demonstration Program
YE 240 REM (Random Graphs)
GR 250 DIM P(8)
AI 260 FOR I=0 TO 7:READ J:P(I)=J:NEXT I
XE 270 DATA 128,64,32,16,8,4,2,1
OW 280 POKE 709,12:POKE 710,0:POKE 712,20
   8
DF 290 GOSUB GR8:COLOR 1
YP 300 PLOT 27,0:DRAWTO 27,159
ZZ 310 PLOT 28,0:DRAWTO 28,159
BQ 320 FOR Y=1 TO 19:PLOT 25,162-8*Y
PW 330 DRAWTO 26,162-8*Y
LW 340 N=Y:XP=16-8*(N>9):YP=158-8*Y
HI 350 GOSUB 510:NEXT Y
JI 360 ? "0";CHR$(19);:FOR X=1 TO 16
FT 370 ? CHR$(18);CHR$(23);:NEXT X:?
EA 380 ? " 0 1 2 3 4 5 6 7 8 9 1 1 1 1 1 1
   1 1"
GV 390 ? "                    0 1 2 3 4
   5 6"
UC 400 GOSUB GR9
UL 410 FOR C=1 TO 15:COLOR C
ZJ 420 H=140*RND(0)
RB 430 FOR W=0 TO 3
HD 440 PLOT 7+4*C+W,159:DRAWTO 7+4*C+W,H
FY 450 NEXT W:NEXT C
CP 460 V=14:POKE 764,255
YJ 470 IF PEEK(764)=255 THEN SOUND 0,200,
   2,V:V=V-0.25+14*(V=0):GOTO 470
GN 480 SOUND 0,0,0,0:COLOR 0
FB 490 FOR X=11 TO 79:PLOT X,159:DRAWTO X
   ,0:NEXT X
MZ 500 GOTO 410
FK 510 C=8*(ASC(STR$(N))-32)
JJ 520 FOR I=0 TO 7:B=PEEK(57344+C+I)
PB 530 FOR J=0 TO 7
EX 540 IF B-P(J)>-1 THEN B=B-P(J):PLOT XP
   +J,YP+I
EX 550 NEXT J:NEXT I
UM 560 IF N>9 THEN N=N-10*INT(N/10):XP=XP
   +8:GOTO 510
ZP 570 RETURN
```

□

# IMPOSSIBLE

## by Paul Lay

```
EI 1 REM ******************************
UD 2 REM *    MULTIPLE PLAYER DEMO    *
LR 3 REM *           by               *
EX 4 REM *        PAUL LAY            *
EC 5 REM * -------------------------- *
IZ 6 REM *  PAGE 6 MAGAZINE - ENGLAND *
EO 7 REM ******************************
TU 10 REM Machine Code For DLI
PX 20 DATA 72,138,72,162,192,165,203
LP 30 DATA 141,10,212,141,0,208,224
CL 40 DATA 192,240,1,234,224,98,240
JZ 50 DATA 2,165,204,165,204,234,234
YM 60 DATA 234,234,234,141,0,208,202
HA 70 DATA 208,224,104,170,104,64
KZ 80 FOR I=1536 TO 1576:READ J
RE 90 POKE I,J:NEXT I
LC 100 REM Set Up Display
XK 110 GRAPHICS 24
VP 120 POKE 709,6:POKE 710,0
FR 130 DL=PEEK(560)+256*PEEK(561)
JO 140 POKE DL+2,240
EP 150 COLOR 1:FOR I=1 TO 40
TS 160 DRAWTO 319*RND(0),191*RND(0)
GF 170 NEXT I
JK 180 REM Set Up Player Graphics
IU 190 PM=PEEK(106)-40
EH 200 POKE 559,62:POKE 54279,PM
VF 210 POKE 53277,3
XT 220 DIM T$(20)
RB 230 POKE 704,14:POKE 53248,124
AZ 240 T$="THIS IS PLAYER ZERO"
EY 250 STRT=1068
SR 260 GOSUB 500
AU 270 POKE 705,142:POKE 53249,112
NA 280 T$(16)="ONE":STRT=1328
SX 290 GOSUB 500
RW 300 POKE 706,206:POKE 53250,120
DG 310 T$(16)="TWO":STRT=1584
SK 320 GOSUB 500
SP 330 POKE 707,62:POKE 53251,128
CU 340 T$(16)="THREE":STRT=1840
SQ 350 GOSUB 500
ZB 360 POKE 53252,142:POKE 53253,140
MI 370 POKE 53254,138:POKE 53255,136
EW 380 T$="THIS IS ALL MISSILES":STRT=816
SY 390 GOSUB 500
VO 400 POKE 512,0:POKE 513,6
OI 410 POKE 54286,192
QR 420 REM Move Both Incarnations Of
QB 430 REM Player #0
CB 440 FOR I=122 TO 48 STEP -1
EZ 450 POKE 203,I:POKE 204,245-I
AE 460 FOR J=1 TO 5:NEXT J:NEXT I
QP 470 FOR I=48 TO 122
FF 480 POKE 203,I:POKE 204,245-I
LS 490 FOR J=1 TO 5:NEXT J:NEXT I:GOTO 44
0
IM 500 FOR I=1 TO LEN(T$):FOR J=0 TO 7
YM 510 POKE 256*PM+STRT+8*I+J,PEEK(57344+
8*(ASC(T$(I))-32)+J)
ER 520 NEXT J:NEXT I
ZH 530 RETURN
```

### PLAYDEM

For the second example I would like to quote from De Re Atari, page 5-8 under the section Applications of Display List Interrupts. "Of course, no two sections of the player can be on the same horizontal line, so two incarnations of the player cannot be on the same horizontal line."

This statement is completely incorrect and is disproved by the program PLAYDEM. By using a very precise timing loop, the program allows two incarnations of player 0 to be present in separate halves of the screen. The first incarnation can take horizontal positions 0 to 122, while the second incarnation can take horizontal positions 123 to 255. If either incarnation is outside of this range it will not be visible.

The timing loop is contained within a DLI and the source listing is provided. The timing involved every scan line requires waiting until the first incarnation has been displayed before altering the player's horizontal position. Obviously this technique could quite easily be extended to all of the players (by using NOPs within the timing loop). It would also be possible to change PMBASE as well and thus have completely independent incarnations of each player as long as they are within certain screen bounds.

To position these incarnations of player 0, the horizontal position for the first incarnation should be stored in location 203 and the horizontal position for the second in 204. In the program I have also displayed all the other players and missiles and the playfield to prove that there is no cheating!!

This is, obviously, a very powerful technique and it is feasible that in a game such as PAC-MAN we could generate all the ghosts from merely one player.

```
1000  *=$0600
1010  PHA
1020  TXA
1030  PHA
1040  TYA
1050  PHA
1060  LDA #$00
1070  LDY #$40
1080  LDX #$A0   ; loop over 160 scans
1090 LOOP
1100  STA $D40A
1110  STA $D01B ; disable GTIA
1120  CPX #$A0
1130  BEQ SKIP1 ; first lms ?
1140  NOP
1150 SKIP1
1160  CPX #$42   ; second lms ?
1170  BEQ SKIP2
1180  STA $CB    ; three cycle delay !
1190 SKIP2
1200  STA $CB    ; three cycle delay !
1210  NOP
1220  NOP
1230  NOP
1240  NOP
1250  STY $D01B ; enable GTIA #9
1260  DEX
1270  BNE LOOP
1280  STA $D40A
1290  STA $D01B ; disable GTIA
1300  PLA
1310  TAY
1320  PLA
1330  TAX
1340  PLA
1350  RTI
```

**GRAPHDEM DLI source code**

```
1000  *=$0600
1010  PHA
1020  TXA
1030  PHA
1040  LDX #$C0   ; loop over 192 scans
1050 LOOP
1060  LDA $CB    ; first position
1070  STA $D40A
1080  STA $D000
1090  CPX #$C0   ; first lms ?
1100  BEQ SKIP1
1110  NOP
1120 SKIP1
1130  CPX #$62   ; second lms ?
1140  BEQ SKIP2
1150  LDA $CC    ; three cycle delay !
1160 SKIP2
1170  LDA $CC    ; second position
1180  NOP
1190  NOP
1200  NOP
1210  NOP
1220  NOP
1230  STA $D000
1240  DEX
1250  BNE LOOP
1260  PLA
1270  TAX
1280  PLA
1290  RTI
```

**PLAYDEM DLI source code**

# JUST LIKE THE REAL THING

Do you believe in magic? If you're a flying enthusiast like me and don't have £2000 to spend on getting your private pilot's licence, then Sublogic's Flight Simulator II (FS2) is like a wish come true. For the price of one flying lesson you can have unlimited flying time in a well equipped, modern light aircraft. Agreed, it's only a simulation, but it's just like the real thing.

## EXCELLENT DOCUMENTATION

For around £45 you get a well presented package containing two disks, two manuals, maps and a reference card. One disk holds program code, while the other contains scenery data. This is loaded as required by the program, depending on the area over which you're flying. More about this later.

As with all complex programs, the documentation supplied can make or break the whole package. In this case the documentation is excellent. The Pilot's Operating Handbook explains the many controls needed to fly the aircraft in its 90 pages. It also describes how to position the aircraft at any point and time within the simulated "world" of FS2, which covers an area of some 100 million square miles. The 92 page Flight Physics manual covers the theory of flight, gives eight step by step flying lessons, and explains how to perform many aerobatic manoeuvres. Both manuals include many diagrams and illustrations which are generally quite easy to follow.

The four maps cover the geographical areas included in the basic package, namely, New York, Chicago, Seattle and Los Angeles. These are aerial navigation maps, showing airports and radio navigation aids available to the FS2 pilot. They correspond to the four areas on the scenery disk. Note that all scenery details, including airfields, are based on real life, and are not hypothetical items dreamed up by the programmer. This applies to the radio navigation aids too.

Sublogic have at last begun releasing additional scenery disks. In the USA there are now 12 more disks available, covering the whole of the continental USA. As usual, the Atari enthusiast has been left out, with currently only Commodore and other machines covered. However, I phoned Sublogic and they tell me the Atari version may be available "sometime this summer".

## WHAT CAN YOU DO?

What does it do, you ask? Well, it accurately simulates all aspects of flying a light aircraft - not just landings, as with some other simulators. You can taxi along the ground to the end of a runway, take off, climb, turn, do aerobatics (including stalls and spins, very unusual on a simulator), descend, and land. Also, the simulation isn't just of any old aircraft. It's based on a Piper Archer II, and uses 47 of the flight characteristics of that aircraft to reproduce the illusion of flight.

The program requires a minimum of 48K, although it's better with 64K. With 48K you lose certain features, such as the ADF radio navigation aid, some graphics features, and communication with air traffic control. Also "reality mode" is missing, which allows aircraft behaviour to be simulated even more accurately (such as random failure of vital aircraft systems, like the fuel system). Even so, the 48K version is still very complex, and satisfyingly realistic.

Booting up the program disk puts you on the end of the runway at Meigs Field, Chicago, with the engine running ready for take off. The screen shows an excellent representation of your instrument panel, and above it you see a three dimensional view through the windscreen - just like the real thing.

All controls may be operated through the keyboard, requiring you to know about 60 different key combinations! In addition, the main flying controls (ailerons/rudder, elevators and brakes) are available through joystick 1 and throttle and flaps through joystick 2. Personally, I find keyboard and one joystick the best combination for ease of use. Space does not permit me to list all of the controls. Let's just say that if you can find it on a real

# Flight Simulator II

**reviewed by John S. Davison**

aircraft, you'll probably find it here, including a generous array of radio communication and navigation aids (which all work). The sheer quantity of controls seems daunting at first, but don't worry - it's surprising how soon you get the hang of them. The manuals explain most things fairly lucidly anyway.

## READ THE MANUAL

Don't be tempted to use this simulator without first reading the documentation - you'll get nowhere without it. Even with it, you'll need lots of patience before that magical moment arrives when you complete your first flight successfully, including take off, circuit of an airfield, and landing.

From the moment you begin operating the controls, you start to appreciate the detail that's gone into this program. Let's go through part of a flight, and I'll describe how FS2 reacts to give you an idea of the realism. Imagine we are sitting in the aircraft on the end of the runway at Meigs Field, Chicago, waiting to take off. As we open the throttle, the noise of the engine increases and the digital rev counter reading builds up to show we are at full power. The aircraft begins to accelerate down the runway, and the air speed indicator needle moves round its dial as the speed builds up. Unlike certain other simulators, these dials have numbers round them, so you get realistic quantitative information from them. The view through the windscreen changes as you accelerate down the runway. You see the runway centreline zipping under you as you gather speed. On reaching flying speed, a few notches of "up elevator" causes the aircraft to leave the ground and begin climbing. At this point the needle on the vertical speed indicator moves round its dial to tell you how fast you are climbing, the altimeter needles begin to move slowly round their dial registering height, and the artificial horizon line drops down showing your aircraft is in a nose high attitude.

Now, look out of the window. You have a true 3D view and are flying "into" the scenery you see. Details on the ground slide past you as you fly over them. You can use the view selector to view this 3D motion. One interesting view is to look directly backwards at the airfield you take off from, and watch the perspective change as you climb away from it. Be careful, though. I don't recommend this until you've got the hang of take offs!

## LANDMARKS

Ground detail is generally better than that in many other simulators. There are certain "interesting topographical features", as the manual calls them. These are famous landmarks in the areas concerned, usually represented in the form of "wire frame" graphics. Before you dismiss this as boring and unworthy of the Atari's capabilities, please note that these graphics are fully three dimensional, and fairly true to life - even recognisable, if you know the originals. For instance, New York has the Empire State Building, the twin towers of the World Trade Centre, the Statue of Liberty, and Manhattan Bridge. All are shown in their correct locations and correct scale. As they are three dimensional you can fly round them, between them (in the case of the World Trade Centre towers) and, if you're daring enough, under them (in the case of Manhattan Bridge). As you fly near them, you can view them through the windscreen, or through the side windows, backwards, or at any 45 degree angle, and still get the correct 3D view.

Other major features include the John Hancock Building and Sears Tower in Chicago, and the Space Needle in Seattle. Also near Seattle is the magnificent snow capped Mt. Ranier. The Los Angeles area does not seem to have major architectural features, but it does have a realistic road system, coastline details, and mountain ranges.

Airports, too, are presented in detail. Rather than seeing a simple "inverted V" as the visual representation of a runway from the air, you are given a realistic picture of all the main runways. On the larger airfields you see the taxiways as well. You can land or take off from either end of any runway, and while on the ground you can taxi from any point of the airfield to any other point. One of the airfields has a terminal building (shown in 3D colour filled graphics). You can taxi from here, along various taxiways to the runway of your choice. Major airports even have the runway heading numbers painted on their thresholds, again, just like the real thing. When you take off, you even get an inverted view of this number as you approach it from the opposite end of the runway.

Some airfields, usually the smaller ones, are depicted as black runways with white markings, i.e. colour filled graphics. The larger airfields (such as New York's JFK airport) have a "line drawing" appearance. Presumably, you need a lot more power than an 8 bit computer can deliver to handle 3D manipulation and colour filling something of this complexity. (I wonder how the ST handles it?)

Certain airfields have refuelling facilities. If you land at one of these, and taxi to the refuelling area your fuel tanks get refilled. That's another touch of realism - as you fly you use fuel, and this fact is registered on your fuel gauges. It is possible to run out of fuel after several hours of flying, so you have to keep an eye on those gauges.

## SET YOUR OWN PARAMETERS

Yet another great feature of FS2 is its Editor. This gives you access to two screens full of control parameters governing your flight. You can set wind speed and direction at three different heights, also specifying the heights at which the changes in direction occur. You can also set cloud cover and thickness at two different levels. My only minor grouse here is that you can't set partial cloud cover - the sky has to be completely overcast or completely clear. If you're a masochist, these features let you set up difficult weather conditions to fly in. Versions of FS2 on other machines also implement air turbulence, which can toss your aircraft around in realistic manner. I was disappointed to find that Sublogic haven't included this feature in the Atari version. Season of the year and time of day (or night) can also be set. Dusk and dawn occur at different times, depending on the season of the year. When flying at night, you'll find ground detail is replaced by lights, including the rotating beacons found at most airports in the USA.

## DIFFERENT SCENARIOS

You can set the aircraft's location based on its world co-ordinates, height, airspeed, heading, and the position of all relevant controls. The co-ordinates are used to determine which scenery and navigation data to load from the scenery disk. Using

*continued on page 33*

# *FLIGHT SIMULATOR II*

**continued**

these features you can set up virtually any flight scenario. What's more, you can store them, so they're available at any time at the push of a key. For instance, if you want to practice a landing approach into Meigs Field, Chicago without having to take off and fly the circuit first, you simply key in the appropriate values in edit mode, and specify you want them saving. When you exit edit mode, you find yourself in the requested position. If you crash, the system will reset to your parameters. Or, if you want to abort the approach and start again, a simple keystroke will do this for you. You can enter edit mode at any time by pressing the ESC key, so you can check parameter values for use on other occasions whenever you want. There is also a feature called "slewing", which enables you to slide your aircraft around in three dimensions (at high speed, if required) to position it visually at any point.

FS2 comes with starter sets of parameters, called User Modes, which set up 10 different scenarios for you. The default mode sets up the Meigs Field scenario mentioned erlier. You may set up another 15 modes using your own parameters and save them to disk for use anytime. One of the supplied modes is, in fact, a game, known as the World War I Ace game. This involves you flying your WWI biplane to bomb enemy airfields and dogfight with enemy fighters. This is a feature I don't personally like too much, but may be useful for light relief after a tense, serious session with the simulator.

The radio equipment reflects that you'd find in many light aircraft today, covering voice communications and radio navigation aids. If you know what VOR, ADF, DME, and ILS are, you'll be pleased to know they're all here. If not, you'll soon learn what they do and how to use them. Any budding pilot can learn the concepts of radio navigation aids from FS2. It doesn't take long to learn how to fix your position using VOR and ADF, or to navigate from A to B using only your radio aids.

## JUST LIKE THE REAL THING

The Instrument Landing System (ILS) is one of the jewels of this simulator. The first time I tried an ILS approach through thick cloud I was amazed. The instruments behaved.....yes, you guessed it..... just like the real thing. The localiser and glide slope needles desperately pointed the way back to the right approach path, the marker beacons bleeped as the aircraft passed over them, and the Distance Measuring Equipment readout slowly counted down the distance to the airfield as I wobbled my way towards it. Then, on breaking through the cloud layer, seeing the airfield runway ahead gave me a thrill I've experienced from no other computer simulation.

One final word - because this is a simulation, not a game, it works in real time. If your flight would take 90 minutes in real life, then this is how long your simulated flight takes. To some people, this would quickly bring on boredom. However, if like me, you've a lot of Biggles in you, then you'll find a use for that time as a real pilot would, doing instrument checks, getting navigation fixes, and looking at the scenery. You really can "live" the flight. I can think of no greater compliment for a flight simulation program. ●




# Fly Even Further!

**40 Great Flight Simulator Adventures**
**A book Review**
**by John S. Davison**

**Book published by Compute!**
**Price £9.95**

Ever wanted to know what all the geographic features are you see in Sublogic's excellent Flight Simulator II (FS2)? Ever wondered just how many things there are you haven't seen? Ever wondered what you can do with the program now you've mastered the basic flying skills? Well, wonder no more, as this unique book will help in all of those areas.

Author Charles Gulick is obviously not the average sort of FS2 nut. His enthusiasm goes much further than that. Not only has he created 40 FS2 adventures for you to fly, he's added interest in the form of fictional situations, and historical or geographic facts to make the scenarios more realistic and interesting.

The style of the book, too, is unique. It's designed to act as the "voice" of your flight instructor. The book's written as if Charles Gulick is sitting next to you in the aircraft, telling you what to do and what to look out for.

It begins with a general introduction, which you must read first, as it covers the setting up of adventures, general hints on flying them, and explanations of the symbols found against the text in the scenario. Note that you're expected to know how to handle the aircraft's controls, including radio navigation aids, so complete beginners with FS2 may have trouble with some of the adventures. A few, however, require little action from the FS2 pilot, and are suitable for those with little experience. It would have been helpful if the author had marked each adventure with some sort of difficulty level, showing which are suitable for beginners, and so on.

Each adventure is structured in the same way. The first page shows a screen shot from the adventure, and a list of the parameters you need to key into FS2 in Edit mode to set up the adventure. For example, aircraft position, altitude, airspeed, weather conditions, and so on. Following pages contain the text of the adventure. A brief introduction is given, followed by numerous paragraphs describing the actions you should take, things to look out for, and when you should take over control. Each paragraph has a large symbol printed against it to show at a glance what the paragraph is about. This is useful, as you can quickly determine where you're required to take specific actions without reading all of the text.

Let's have a quick look at some of the adventures, so you can get the feel of what the book's about. Each adventure has a title, and this is the title used in the descriptions below.

**To Breathe Free:** This flight takes us from New York's La Guardia airport, over New York City passing between the Empire State Building and the World Trade Centre towers. Then we cross the Hudson River into New Jersey and turn and fly back for a low pass over the Statue of Liberty before heading back up the East River for a landing at La Guardia. As well as pointing out the not so obvious features of the scenery, such as Flushing Bay, Whitestone Bridge and Throg's Neck Bridge, the author also points out features not seen in the FS2 graphics, for example the Palisades - the beautiful steep cliffs on the New Jersey side of the Hudson River.

**A Game Of Bridge:** This adventure starts off in flight rather than on the ground. The flight parameters have you at the right height, airspeed and heading to permit you to fly under the Manhattan Bridge, over New York City's East River. In fact, the parameters given are not quite correct. I found I had to reduce the throttle setting slightly to prevent the aircraft climbing slowly and flying over the bridge instead of under it.

After a few passes to get the feel of things, you can take over the controls and fly the adventure yourself.

**Goldilocks:** This is a mercy mission from El Monte airport in Southern California to Catalina Island in near impossible weather conditions. You are delivering special medical supplies to save the life of a little girl who's been bitten by a rare Pacific bug. Your radar is out of action and you can't see the airfield because of fog. Any safe landing on Catalina Island is an acceptable conclusion to this adventure.

**Threading the Needle:** This adventure has you starting on the ground at Renton Municipal airport in Seattle. I found the starting point a little confusing as the radar shows you to be in the middle of a city, and the view through the window is a white dashed line against a black background. However, once you orientate yourself and take off, all is well. The flight takes you to the Space Needle in Seattle. This is a building left over from the 1962 World Fair. On the way, the author points out the main landmarks. These include the snow capped Mt. Ranier, Lakes Washington and Sammamish, Mercer Island, and two major roads in the area - Interstate 405 and 90.

Another adventure later in the book has you making precision turns around the Space Needle, while watching it from a view through the side window of your aircraft. As an extra, I discovered you can fly through the restaurant at the top of the tower without coming to any harm! This takes very precise control of altitude to get just right, though.

These are just a few of the 40 adventures provided by this book. Some are short, lasting only a few minutes. Others are very long, up to about two hours. Some put you in emergency situations, like engine failure 10,000 feet above Seattle. Others explore strange phenomena (bugs?) of FS2, like the strange happenings at the summit of Mt. Ranier. I won't spoil things by telling you what happens. Yet others test your piloting skill, such as a night landing at Los Angeles International Airport, and a night landing at Meigs Field, Chicago with a 90 degree crosswind.

If you're an ardent FS2 fan like me, you'll find all the adventures interesting, some intensely so. I did find several features described not present in the Atari version, for example the UFO in the Pyramid Power adventure only appears in the IBM PC version. However, the Atari version has something a little more subtle to baffle you - it's not mentioned in the book. I'll leave you to find it for yourself. Also, the moonlit runways are not present, and the Atari version doesn't have wind turbulence implemented, which could have added a little extra interest to a couple of the adventures. ●

*This book should be available from your local Atari retailer - try them first. Alternatively copies can be obtained from PAGE 6 at £9.95. Subscribers will find details enclosed with this issue.*

# QUICK DISASSEMBLER

by Ata Atun

When I started to learn Machine Code, I desperately needed a DISASSEMBLER to investigate and study the Machine Code Programs written by the Advanced ATARI users. The only Disassembler program I could find, wasn't a very helpful and detailing one, but I had to manage with it till I reached a certain knowledge level. I then felt I had to design a better and more detailing program, and now I believe that the DISASSEMBLER program below is a very good one for Machine Code beginners and advanced programmers. It is fast and can detail Addressing Modes, and can address the backward and forward branches.

Before running the Program please save it to Disk as "D:DIS.ASM" or to cassette and then RUN it.

**Structure of Disassembler Program:**

A) Strings and Variables

M$ DIMensioned (1024) originating from 255 possibilities in a 6502 Machine Code System Byte. (255*4+4=1024) Adding 4 to multiplication 255*4, is the last 4 locations of 255th place.

LCT$ DIMensioned (256) based on same reason explained above. Since 0th place can not be called in a String, for 255 possibilities LCT$ is DIMensioned to 256 places to be used as LCT$(1,256) instead of LCT$(0,255).

TR$ Transfer String to be used in specific location transfer from M$.

LOC1 Content of Main ADDRESS, 1st location.

LOC2 Content of 2nd location.

LOC3 Content of 3rd location.

LOC4 Used in Branches. Backward branching.

LOC5 Used in Branches. Forward branching.

ADRS Main Address with MNEmonic.

B) Contents of Strings:

M$ Consisted of 255 main MNEmonics, each 4 locations long. First 3 locations hold the Mnemonic. 4th location classifies the Mnemonic.

| | |
|---|---|
| "#" | Immediate |
| " " (Void) | Absolute or Zero Page |
| "a" | Absolute or Zero Page |
| "b" | Absolute,Y |
| "c" | (indirect,X) |
| "d" | (Indirect),Y |

LCT$ Total of 256 codes that classifies each Addressing mode in detail, separates Absolute and Zero Page, branching Mnemonics, Implied and Relative addresses.

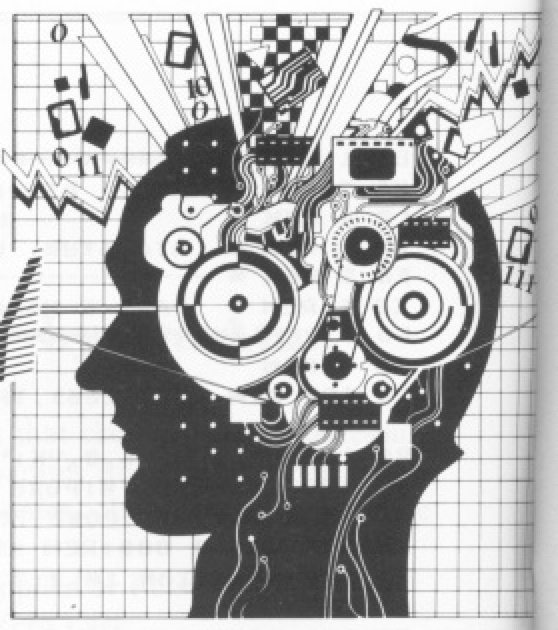
| | |
|---|---|
| "1" | 1 byte long, Implied or Relative |
| "2" | 2 bytes long, Zero Page |
| "3" | 3 bytes long, Absolute. |
| "4" | Branchers, 1 byte long, Relative. |
| "5" | No MNEmonic, 1 byte long. |
| "6" | JMP (Arg), Implied, 1 byte long, location 108 only. |

Combination of M$ and LCT$ specifies Addressing Mode very clearly. For example: Void " " in 4th place of M$ with 2 code in LCT$, specifies a ZERO PAGE, 2 BYTE LONG ADDRESSING MODE.

**How The Program Flows.**

| | |
|---|---|
| Up to 130 | DIMensioning, Opening a Channel and text Graphic plus screen and border colour. |
| GOSUB 800 | This section holds M$ and LCT$. I could keep these values in DATA and use READ-DATA-POKE combination but this routine is boring when you hurry for a quick start |
| 130-200 | Head line, start Address, End Address and check address. |
| 200-210 | Start of 20 line per screen Disassembling. |
| 220-280 | Content of ADRS. Locates exact place in M$. Get the 4 place long string. Get the classifying Code from LCT$ string, exactly the same location. Print address and content of Address. |
| 290 | According to the value of TR, GOTO to the matching section. |
| 400-450 | 1 byte long Mode section. Determines the exact Addressing Mode, Implied or BRK-Implied. |
| 450-500 | 2 byte long Mode section. Determines Zero Page or Absolute. |
| 500-550 | 3 byte long Mode Section. Determines Absolute or Absolute,X. |
| 550-600 | Branching Modes only. Determines forward branch or Backward branch. |
| 600-650 | 1 byte long but No MNEmonics, abbreviated as "? " in M$ string. |
| 650-700 | JMP(Arg), Implied Mode only, which is a special jump. |
| 700-760 | Final check and request to continue. If END of address reached, stops the execution. |
| 1000 | Gosub section for Determining very quickly the Addressing Modes. |

```
EI 1 REM ******************************
XS 2 REM *       DIS-ASSEMBLER        *
LR 3 REM *             by             *
GX 4 REM *  ATA ATUN, Northern Cyprus  *
EC 5 REM * -------------------------- *
IZ 6 REM *  PAGE 6 MAGAZINE - ENGLAND  *
EO 7 REM ******************************
NN 8 REM
LU 100 DIM LCT$(256),TR$(4),VL$(5),M$(102
   4)
PC 110 OPEN #1,4,0,"K:"
SD 120 GRAPHICS 0:POKE 709,2:POKE 710,28:
   POKE 712,114:POKE 752,1
XH 130 GOSUB 800:REM string section
HP 140 POSITION 10,2:? " Quick Disassembl
   er "
GR 150 POSITION 3,8:? "Please Input the f
   ollowing values         in  DECIMA
   L  only."
ZA 160 POSITION 2,12:? "Starting Address
   :";:INPUT SA:ADRS=SA
JP 170 POSITION 2,14:? "Ending    Address
   :";:INPUT EA:EA=EA+1
HH 180 IF EA<SA OR SA<0 OR SA>65535 THEN
   140
VQ 190 REM 20 lines each time on screen
RW 200 ? "K":POSITION 2,0:? "loct. bt1 bt
   2 bt3 mnm argument  Mode "
JA 210 FOR CYC=1 TO 20:LOC1=0:LOC2=0:LOC3
   =0
GO 220 LOC1=PEEK(ADRS)
JS 230 B=LOC1*4+1:E=B+3
QQ 240 TR$=M$(B,E)
XP 250 TR=VAL(LCT$(LOC1+1,LOC1+1))
DT 260 ? ADRS;
AZ 270 POKE 85,8:? LOC1;
KN 280 POKE 85,12
MH 290 ON TR GOTO 400,450,500,550,600,650
MD 400 REM  TR=1 (1 location)
QR 410 POKE 85,20:? TR$(1,3);:POKE 85,32
AO 420 IF TR$(1,3)="BRK" THEN ? "Implied"
   :GOTO 700
BK 430 IF TR$(1,1)="B" THEN ? "Relativ":G
   OTO 700
EQ 440 ? "Implied":GOTO 700
JH 450 REM  TR=2 (2 locations)
BN 460 LOC2=PEEK(ADRS+1)
CK 470 ? LOC2;:POKE 85,20:? TR$(1,3);
YQ 480 VL$=STR$(LOC2):POKE 85,24
XY 490 GOSUB 1000:GOTO 700
TC 500 REM  TR=3 (3locations)
RB 510 LOC2=PEEK(ADRS+1):LOC3=PEEK(ADRS+2
   )
EB 520 ? LOC2;:POKE 85,16:? LOC3;:POKE 85
   ,20:? TR$(1,3);:POKE 85,24
YD 530 VL$=STR$(LOC2+256*LOC3)
XP 540 GOSUB 1000:GOTO 700
KM 550 REM  TR=4 (-1 location)
XH 560 LOC2=PEEK(ADRS+1):TR=2
YX 570 IF LOC2>127 THEN LOC4=256-LOC2:LOC
   5=ADRS-LOC4:IF LOC5<0 THEN LOC5=-LOC4
IY 575 IF LOC2<128 THEN LOC5=ADRS+2+LOC2
CN 580 ? LOC2;:POKE 85,20:? TR$(1,3);
DI 590 POKE 85,24:? LOC5;:POKE 85,32:? "R
   elativ":GOTO 700
SC 600 REM  TR=5 (0 location & Opcode)
ZY 610 POKE 85,20:? "--- No Mnm"
NY 620 TR=1:GOTO 700
DQ 650 REM  TR=6 (JMP Opcode)
RM 660 LOC2=PEEK(ADRS+1):LOC3=PEEK(ADRS+2
   )
EM 670 ? LOC2;:POKE 85,16:? LOC3;:POKE 85
   ,20:? TR$(1,3);:POKE 85,24
UV 680 VL$=STR$(LOC2+256*LOC3):TR=3
NK 690 ? "(";VL$;")":GOTO 700
MF 700 REM  Final check
EM 710 ADRS=ADRS+TR
HL 720 IF ADRS<0 THEN ADRS=65536=LOC2
LW 730 IF ADRS>65535 THEN ADRS=LOC2
TC 740 IF ADRS=EA THEN POSITION 6,22:? "
   Requested Address Reached ":END
VW 750 IF CYC=20 THEN POSITION 7,22:? " H
   it Any Key To Continue ":GET #1,A:? "K
   ":GOTO 200
UQ 760 NEXT CYC
UJ 800 LCT$(1,85)="125552251215533542555
   2251355532532552225121533354255522513
   155335125552251235333542555"
JL 810 LCT$(86,170)="2251255533512555225
   1215633542555225135553355255222515153
   33542552225131553552225222512"
CK 820 LCT$(171,256)="153335425522251315
   3335225522225121533354255522513555335
   2255222512153335425552251355533 5"
XH 830 REM MNEMONICS STRING
SE 840 M$(1,84)="BRK ORAc?   ?   ?   ORA
   ASL ?   PHP ORA#ASL ?   ?   ORA ASL ?
      BPL ORAd?   ?   ?   "
NR 850 M$(85,168)="ORAaASLa?   CLC ORAb?
      ?   ?   ORAaASL ?   JSR ANDc?   ?
   BIT AND ROL ?   PLP AND#"
MG 860 M$(169,252)="ROL ?   BIT AND ROL ?
      BMI ANDd?   ?   ?   ANDaROLa?   SEC
    ANDbCLI ?   ?   ANDaROLa"
JT 870 M$(253,336)="?   RTI EORc?   ?   ?
      EOR LSR ?   PHA EOR#LSR ?   JMP EOR
    LSR ?   BVC EORd?   ?   "
GQ 880 M$(337,420)="?   EORaLSRa?   CLI E
   ORb?   ?   ?   EORaLSRa?   RTS ADCc?
    ?   ?   ADC ROR ?   PLA "
WL 890 M$(421,504)="ADC#ROR ?   JMP ADC R
   OR ?   BVS ADCd?   ?   ?   ADCaRORa?
    SEI ADCb?   ?   ?   ADCa"
WE 900 M$(505,588)="RORa?   ?   STAc?   ?
      STY STA STX ?   DEY ?   TXA ?   STY
    STA STX ?   BCC STAd?   "
UD 910 M$(589,672)="?   STYaSTAaSTXb?   T
   YA STAbTXS ?   ?   STAa?   ?   LDY#LDA
   cLDX#?   LDY LDA LDX ?   "
BL 920 M$(673,756)="TAY LDA#TAX ?   LDY L
   DA LDX ?   BCS LDAd?   ?   LDYaLDAaLDX
   b?   CLV LDAbTSX ?   LDYa"
QG 930 M$(757,840)="LDAaLDXb?   CPY#CMPc?
      ?   CPY CMP DEC ?   INY CMP#DEX ?
    CPY CMP DEC ?   BNE CMPd"
WY 940 M$(841,925)="?   ?   ?   CMPaDECa?
      CLD CMPb?   ?   ?   CMPaDECa?   CPX
   #SBCc?   ?   CPX SBC INC "
XA 950 M$(925,1008)="?   INX SBC#NOP ?
   CPX SBC INC ?   BEQ SBCc?   ?   ?   SB
   CaINCa?   SED SBCb?   ?   "
RF 960 M$(1009,1024)="?   SBCaINCa?   ":R
   ETURN
TG 1000 REM  Sorting Addressing modes
XK 1010 IF TR$(4,4)="#" THEN ? "#";VL$;:P
   OKE 85,32:? "Immedte"
NU 1020 IF TR$(4,4)=" " AND TR=2 THEN ? V
   L$;:POKE 85,32:? "Zero Pg"
UM 1025 IF TR$(4,4)=" " AND TR=3 THEN ? V
   L$;:POKE 85,32:? "Absolut"
RX 1030 IF TR$(4,4)="a" AND TR=2 THEN ? V
   L$;",X";:POKE 85,32:? "Zr Pg,X"
US 1035 IF TR$(4,4)="a" AND TR=3 THEN ? V
   L$;",X";:POKE 85,32:? "Abslt,X"
IV 1040 IF TR$(4,4)="b" THEN ? VL$;",Y";:
   POKE 85,32:? "Abslt,Y"
YE 1050 IF TR$(4,4)="c" THEN ? "(";VL$;",
   X)";:POKE 85,32:? "Indrc,X"
EY 1060 IF TR$(4,4)="d" THEN ? "(";VL$;")
   ,Y";:POKE 85,32:? "Indrc,Y"
AU 1070 RETURN
```



# 12. The HITCHHIKERS GUIDE TO THE GALAXY

**Background:** The Hitchhiker's Guide to the Galaxy is the brainchild of Douglas Adams. It started life in 1978 as a BBC radio series and quickly gained a cult following. From this grew four books, two records, three stage productions, a television series, the promise of a feature length movie and finally, an Adventure from Infocom.

The Hitchhiker's Guide to the Galaxy (hereafter referred to as HGG) is set in a very high-tech galaxy with lots of computers, spaceships, robots and other technological marvels. Strange as it may seem, Adams had never even touched a computer when he originally wrote the radio series. His first encounter with a computer was about three years ago. Now he loves them!

After discovering computers, Adams also discovered Adventures and took a particular liking to Infocom's unique style. I believe he approached Infocom and suggested a collaboration to bring HGG to the computer. Infocom normally does all their work "in house", but this particular collaboration must have appealed to their warped sense of humour. So Douglas Adams teamed up with Steve Meretzky (author of Planetfall and Sorcerer) to bring us yet another Infocom classic.

When HGG was released, it became one of the most reviewed and raved about Adventures around. If you believed everything that was said in the reviews without actually playing the game yourself, you would quickly summise that this is the greatest Adventure of all time! As most people (including myself) are HGG fans, then that's exactly what they would want to hear.

However, after all the hype in the computer press, HGG turned out to be a big disappointment. It is too contrived, too linear (at least until the Heart of Gold) and too illogical to be classed as an adventure. You spend too much time repeating the same moves over and over again or waiting for events to happen. It's also not as humourous as everybody makes out. All in all, it's a frustratingly slow Adventure which is far too hard for any but the most experienced player. Let's face it. How many people do you know who have actually completed the game? And of those who have completed it, how many did so without any help?

**Game Playing Tips and Strategies:** As HGG is such a difficult game, I'll devote the rest of this column to overall game playing tips and strategies followed by the usual hints for solving problems. I'll try not to give too much away, but do not read any further unless you really need help or you are willing to make the game easier than the designers intended.

Firstly, make sure you read the book (or at least the first half) before you play the game. This will not spoil the game. It will simply make you feel more comfortable with the objects, events and characters in the game and help you solve a couple of the very early puzzles. (I will often refer to the book in the following discussion, but listening to the radio series or records or watching the TV series is an equally valid reference.)

You begin the game playing the part of Arthur Dent. (But don't assume you'll ALWAYS be playing Arthur Dent. Some very strange things will happen in this game.) The first thing to do is throw a little light on the situation, get out of bed and find something for the rotten hangover. This shouldn't be too difficult, as the game gently leads you by the hand all the way. The only word of advice I'll give at this stage is to make sure you collect all the objects you find throughout the game, as you never know when you'll need them.

Sooner or later, you'll discover that a large yellow bulldozer from the local council is about to knock your house down to make way for a bypass. If you've read the book, you'll know how to stop the bulldozer - at least temporarily. The following sequence of events is fairly predictable, as it follows the book almost to the letter. I tried everything I could think of to wrench myself out of the predetermined plot, but to no avail. The best advice I can give is to let the game lead you on until you reach the pub.

When you get to the pub, examine everything. If you see something that appeals to you, buy it! Don't let your lack of money be a deterrent. It's just one of the many logical inconsistencies in the game. Apart from this, let the game lead you on in the usual manner.

You may want to save the game when you encounter the small dog. I won't tell you why, but you may appreciate this advice much, much later in the game if you find that you have to start the game over again from this point. Shortly after this, the Vogons will destroy the planet to make way for a hyperspace bypass. (It makes the demolition of your house reem pretty insignificant doesn't it?) If you do the things which enable you to survive this event, you will find yourself in a dark place. This is where you start to encounter some variations from the book.

The dark is a pretty boring sort of place really. However, you'd better get used to it because you'll be spending a lot of time in the dark in this Adventure. You'll probably muddle your way out of it the first couple of times, but later on you

**by Garry Francis of Sydney, Australia**



should try to master it. More on that later. In the meantime, just remember that you have five senses. I hope you can remember them!

By now, you should be in the Vogon hold, complete with the infamous babel fish dispenser. Once again, allow the story to lead you along for a few moves until Ford gives you the Hitchhiker's Guide to the Galaxy. When Ford says, "I shouldn't tell you this, but you'll never finish the game without consulting the Guide about lots of stuff", you'd better believe him! You can start by consulting the Guide about the things of immediate concern (like babel fish and Vogons), but don't waste too much time. The Vogon Captain has already dispatched a search party to find you.

You're no doubt aware by now that you need a babel fish. In the book, Ford just pops one in your ear. Unfortunately, Ford must have forgotten the script in this game, for he is now sleeping like a log. You'll have to get the babel fish yourself, but this turns out to be one of the most confounding and humourous puzzles in the game. If you followed my advice to collect everything along the way, you shouldn't have too much trouble. Most people get stuck at the point where the small upper half of the room cleaning robot appears. The solution is simply to confound it by presenting it with more than it can clean up in one go!

Sooner or later, you'll find yourself confronted by the Vogon Captain and (horror of horrors!) some of his poetry. (If you don't have the babel fish in your ear, then it's useless proceeding. Restore a previously saved game and try again.) If you don't like the Captain's poetry, he'll only read one verse, then have you thrown into space. If you DO like his poetry, then let him know. You'll still get thrown into space, but at least you'll get to hear the second verse. (If you don't know why you should be listening to the second verse, then restore a previously saved game and try again.) Remember that a verse has four lines, but the order of the lines and the specific word you require will change from game to game.

You can make use of your new found knowledge while Ford tries to talk the Vogon guard into a change of career. Then it's into the airlock...

Once again, you find youself in the dark. Just keep your senses about you and DON'T BELIEVE ANYTHING THE COMPUTER TELLS YOU! Next thing you know, you're on the Heart of Gold where you meet Zaphod Beeblebrox Trillian (a.k.a. Tricia MacMillan) and Marvin the paranoid android. In one of the major departures from the book, Ford, Zaphod and Trillian go off to the sauna and leave you unattended in the most advanced spacecraft in the galaxy! Strange. Nevertheless, this is a golden opportunity to explore the ship. It's actually your first chance to do what YOU want to do rather than what the program wants you to do. And yet, this is the point where most people get bogged down. Here's a few hints to prevent you losing interest in the game:

- Forget about the screening door for the time being. The solution to this problem will become obvious towards the end of the game.
- If the computer's lied to you once, it may do so again. Be persistant!
- Examine everything and, most importantly, consult the Guide about EVERYTHING including all the objects you've had since the beginning of the game.

Once you have the atomic vector plotter the spare Infinite Improbability Drive and a source of Brownian motion (you DO have all these items don't you?), the fun really begins. Get everything connected up and working properly, press the switch and...oh no, not the dark again!

I told you you'd spend a lot of time in the dark! As it turns out, you'll find yourself in the dark every time you use the Infinite Improbability Drive. The first time you use it, you'll probably end up confronting the Ravenous Bugblatter Beast of Traal. From then on, it seems to be somewhat random - unless you can find a better source of Brownian motion! Fortunately, the key to this lies on Traal, but you'll only find it if you can best the Bugblatter Beast. (The Bugblatter Beast is another of the many logical inconsistencies in the game. It is supposed to be one of the most stupid creatures in the galaxy, yet it can talk and write and maintains a database of its victims!).

The game has eight scenarios, each of which is accessed from the dark. By the time you return from Traal, you will have visited four of these (i.e. Arthur's village, the Vogon spaceship, the Heart of Gold and Traal). You can now attempt to visit the others using the Infinite Improbability Drive, but you never know where you'll end up unless you've conquered the randomness factor mentioned above. As a matter of fact, there's one scenario that you CAN'T visit until you've at least partially solved this problem. Be prepared to do some experimenting in the dark. Read the description very carefully and take note of how they differ from your previous experiences. With a little experimentation, a lot of persistence and a smattering of divine intervention, you will soon be able to go anywhere you like at any time.

If you've been following my master plan so far, you need only visit the four remaining scenarios. (You should also revisit one of the earlier scenarios, but there's no way on earth I'll tell you which one!) As though enough strange things haven't happened so far, you'll now find yourself going back in time and even changing character! If you've consulted the guide about the right stuff (what rhymes with stuff?), you'll know what you're looking for in these scenarios. Finally, keep in mind that no one with a particle of common sense will finish this game!

Ah, at long last you're back on the Heart of Gold for the last time. If you've been thorough in your explorations, you'll have all the items you need to put an ancient legend to the test. I hope you like gardening. If you do, you'll soon be enjoying the fruits of your labour, not to mention a strange vision. The tool in the vision is different from game to game, so I hope you've been collecting all the tools along the way. There are ten in all. You'll only need one when the time comes, but if you're missing one, you can bet it will be the one you need.

Well, after all that, I reckon it's about time to tackle that screening door! This is easy, yet it's not easy. Get the idea?

**HINTS overleaf**

**All you need now is something to cheer you up to counteract Marvin's manic depression. Poor old Marvin. He's spent all game being depressed. Maybe he'd feel better if you gave him something to do. Or then again, maybe not. Answer, once you've solved this last puzzle, you'll find yourself standing on Magrathea, eagerly looking foward to The Hitchhiker's Guide to the Galaxy Part 2!**

**Hints:** If you get stuck on a specific problem, browse through the accompanying questions until you find the area where you're stuck. Match the numbers for that question with the words in the accompanying list to create a hint. (Incidentally, for all you HGG fans, you'll notice something very special about the number of hints. I can assure you that it was purely accidental, but I'm curious as to whether it has any relevance to the question of life, the universe and everything. Any ideas?).

If you get really desperate, Infocom, sells an Invisiclues hint booklet which is sure to answer all your problems. This should be available from your local computer store or mail order house.

**Next Issue:** Next issue we return to earth to go dragon hunting in the best Adventure I've played for a long time. In the meantime, if you have any queries or suggestions for the column, feel free to contact me at the address below. Please include a couple of International Reply Coupons if you expect an answer, as overseas airmail postage gets to be pretty expensive.

Garry Francis,
c/o Atari Computer Enthusiasts (N.S.W.), Adventure S.I.G., G.P.O. Box 4514, Sydney, N.S.W. Australia 2001

---

1) Can't stop the bulldozer?
6 29 33 3 60 26 50 70 64

2) Puzzled about the small dog?
22 11 32 64

3) Can't escape the demolition of Earth?
12 53

4) Can't get out of the dark?
45 51 31

5) Can't get the atomic vector plotter?
14 65 44 80 54

6) Can't get the babel fish?
45 61 87 5 24

7) Vogon Captain only reads one verse of poetry?
34 29 39 11 64

8) Can't get out of the dark?
6 29 30 64

9) Can't leave the exit to port?
22 38 50 64

10) Don't know what to do with the atomic vector plotter?
14 65 44 11

11) Missing a spare Infinite Improbability Drive?
16 79 35

12) Can't go aft from the aft end of the corridor?
46 57

13) Still missing a spare Infinite Improbability Drive?
48 52 84

14) Can't read the message on the printed circuit board?
45 88

15) Can't find the Nutrimat/Computer Interface?
16 79 35

16) Haven't been off the Heart of Gold yet?
45 71 68 20

17) Can't get past the Ravenous Bugblatter Beast of Traal?
14 65 44 11

18) Still can't get past the Ravenous Bugblatter Beast of Traal?
7 11 75 90 11 28 40 73 29

19) Can't control where you end up after using the Infinite Improbability Drive?
69 19 38 13

20) Can't stop the nuclear missiles?
45 66 77 49

21) Haven't been to the party?
36 44

22) Don't know what to do at the party?
48 41

23) Still don't know what to do at the party?
14 65 44 10

24) Haven't been to Damogran?
6 29 2 64

25) Can't open the toolbox?
37 1 76

26) Can't avoid smashing the speedboat?
78 63

27) Don't know what to do at the dais?
85 4 86 25

28) Having trouble at the dais?
43 51 72

29) Haven't been to the War Chamber?
6 29 30 64

30) Can't escape the maze?
60 67 21

31) Don't know what to do with all the fluff?
14 65 44 11

32) Missing a flowerpot?
16 79 35

33) Haven't encountered the sperm whale?
15 59 47 23 64

34) Still haven't encountered the sperm whale?
36 44

35) Can't get the flowerpot?
45 89 8 42

36) Can't get the sprout to grow?
9 22 18 62

37) Can't get past the screening door?
14 65 44 11

38) Still can't get past the screening door?
15 59 47 23 64

39) Can't get no tea?
82 3 81 64

40) Can't survive Marvin's depression?
6 29 74 27 55 23 56 64

41) Can't open the hatch?
15 59 58 64

42) Don't know what tool to use?
16 59 83 17 64

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | UNDER | 14 | CONSULT | 27 | WITH | 40 | ALREADY | 53 | RIDE | 66 | MANUAL | 79 | NEXT |
| 2 | BLIND | 15 | GOT | 28 | HAS | 41 | ARTHUR | 54 | FISH | 67 | COMMON | 80 | BABEL |
| 3 | TO | 16 | SEE | 29 | YOU | 42 | BOOMERANG | 55 | ADVANCED | 68 | IMPROBABILITY | 81 | MAZE |
| 4 | HEART | 17 | LATELY | 30 | DEAF | 43 | EXERT | 56 | SUBSTITUTE | 69 | INSTALL | 82 | BEEN |
| 5 | SATCHEL | 18 | TROPICAL | 31 | NOSE | 44 | ABOUT | 57 | PERSISTENT | 70 | DOWN | 83 | VISIONS |
| 6 | ARE | 19 | NUTRIMAT | 32 | HUNGRY | 45 | USE | 58 | HELPERS | 71 | INFINITE | 84 | ROOM |
| 7 | FOOL | 20 | DRIVE | 33 | GOING | 46 | BE | 59 | ANY | 72 | AUTHORITY | 85 | STEAL |
| 8 | OR | 21 | SENSE | 34 | DID | 47 | REAL | 60 | TAKE | 73 | EATEN | 86 | OF |
| 9 | FUZZBOL | 22 | IS | 35 | QUESTION | 48 | EXAMINE | 61 | GOWN | 74 | HAPPY | 87 | TOWEL |
| 10 | FLUFF | 23 | TEA | 36 | FEEL | 49 | RECEPTACLE | 62 | PLANET | 75 | INTO | 88 | MAGNIFIER |
| 11 | IT | 24 | MAIL | 37 | LOOK | 50 | LYING | 63 | EMERGENCY | 76 | CUSHION | 89 | THUMB |
| 12 | HITCH | 25 | GOLD | 38 | COMPUTER | 51 | YOUR | 64 | ? | 77 | OVERRIDE | 90 | THINKING |
| 13 | INTERFACE | 26 | THIS | 39 | ENJOY | 52 | ENGINE | 65 | GUIDE | 78 | CREATE | | |

# GOTO DIRECTORY

The GOTO DIRECTORY is a guide to retailers who provide product support for ATARI computers. Many of these retailers will supply Mail Order so if you have problems finding a supplier, turn to the GOTO DIRECTORY.

Retailers who are interested in an entry in this feature should contact the Editor on 0785 213928

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GOTO

# TRAIN CRAZY

by Colin Faller

Welcome to TRAIN CRAZY, the game that will have you jumping mad. Your character is Oscar the Ostrich. Oscar is not only plain crazy but Train Crazy as you will find out.

Oscar prefers the fresh air and likes to travel on top of the train. No problem of course until the train comes to a tunnel when Oscar has to run for his life! What makes things worse is the Railway Company don't like birds travelling on top of their trains and so have hung several chains from the overhead wires to deter the 'roof-riders'. They have also hung up some tempting diamonds in the hope that Oscar will jump up and crack his head, but Oscar is smarter than that and can often grab the diamonds for himself.

To help Oscar survive you must duck under the chains and jump up and collect the diamonds as well as jumping between carriages and avoiding the tunnel! The higher the level, the more obstacles there are and you will find it harder to get the diamonds as you progress. At the end of each level, Oscar will jump off the train and your score will be displayed. You will then start the next level or, if you have lost a life, re-start the existing level. Oscar has five lives each game.

There are four ways of losing a life.

1. Getting knocked off the train in the tunnel?
2. Hitting one of the obstacles.
3. Running out of energy.
4. Jumping too soon for the diamonds and knocking yourself out.

## PLAYING THE GAME

The game is loaded in two parts.

Part One loads the character set and scrolling routine and draws the train It will take about 33 seconds. When this listing is RUN it will load Part Two automatically.

After about 4 seconds of initialisation once Part Two has loaded, you will hear the train whistle and will then be ready to play. Use a joystick in port 1 and press either the Fire button or START key.

**JOYSTICK MOVEMENTS:** Up - will make Oscar jump up to catch the diamonds, jump over obstacles and jump from carriage to carriage. You must be careful not to jump too soon or you will hit the objects above the diamonds and lose a life. Down - Makes Oscar duck to avoid the hanging chains.

**FIRE BUTTON:** Each time you press the Fire button, Oscar will move forward. If you take your finger off he will move back with the train. If you don't keep him moving he will go into the tunnel and lose a life.

**SCORING:** When you first start the game, you are given 28 Energy Units but these decrease as the game progresses. Each time you get a diamond, you get 200 points and an extra 3 Energy Units so you must collect diamonds to complete the game. Each diamond collected will be displayed at the top left of the screen. When the game is over you will be rated, according to your score, as follows.

TRY AGAIN - Less than 4,000 points - not very impressive!

GOOD SCORE - 4,000 points or more.

GREAT SCORE - Over 10,000 points.

EXCELLENT SCORE - Exceeding 15,000 points - no mean feat!

To play again, press either the START key or SYSTEM RESET.

My own highest score to date is 16,455 in 10 levels. Can you do better!

## TYPING IT IN

Type in both Listings. 400/800 owners should make sure they change line 10 of listing 2 as indicated in the REM statement for that line. Cassette users should change line 380 of listing 1 as indicated in the REM statement for that line.

TO SAVE ON DISK: Save the first listing with SAVE "D:TRAIN" and the second listing on the same disk with SAVE "D:CRAZY". To play the game type RUN "D:TRAIN".

TO SAVE ON CASSETTE: Save the first listing with CSAVE. Leave the tape in position and save the second listing with SAVE "C:". Rewind the tape and CLOAD. Type RUN and the first part will automatically load and RUN the second listing.

```
CS 1 REM ##################################
RY 2 REM #      TRAIN CRAZY (Pt.1)        #
ZV 3 REM #             by                 #
GV 4 REM #        COLIN FALLER            #
SG 5 REM # ------------------------------ #
XD 6 REM #  PAGE 6 MAGAZINE - ENGLAND     #
CY 7 REM ##################################
NN 8 REM
FH 9 GRAPHICS 8:GOSUB 10:GOTO 100
TX 10 GRAPHICS 2+16:POKE 559,0:SETCOLOR 3
   ,1,14:SETCOLOR 4,13,8:SETCOLOR 1,0,0:S
   ETCOLOR 0,6,2:SETCOLOR 2,9,4
GT 11 ? #6;"      tRAIn  CrAZY"
YV 12 ? #6;"      -▀▄-▀▄-▀▄-▀▄"
VT 13 ? #6;"            BY"
GY 14 ? #6;"            ▀▄"
WQ 15 ? #6;"     COLIN FALLER"
NX 16 ? #6;"      ▀▄-▀▄-▀▄-▀▄"
WS 17 ? #6;"  characters ←00"
LC 18 ? #6;"          train ←00"
EF 19 ? #6;"        SCROLL ←00"
YX 20 ? #6:? #6;""
LT 21 ? #6;"   reading PART one":POKE 559,
   34:RETURN
VX 100 RAMTOP=PEEK(106):RESTORE 2000:STAR
   T=RAMTOP-8:CH=256*START
MU 109 REM CHARACTERS
PU 110 FOR I=CH TO CH+727 STEP 7:READ A1,
   B1,C1,D1,E1,F1,G1:POKE I,A1:POKE I+1,B
   1:POKE I+2,C1:POKE I+3,D1:POKE I+4,E1
SA 115 POKE I+5,F1:POKE I+6,G1:POSITION 1
   3,6:? #6;39911-I;" ":NEXT I
UY 120 FOR I=CH+776 TO CH+994 STEP 7:READ
    A2,B2,C2,D2,E2,F2,G2:POKE I,A2:POKE I
   +1,B2:POKE I+2,C2:POKE I+3,D2
JA 122 POKE I+4,E2:POKE I+5,F2:POKE I+6,G
   2:POSITION 13,6:? #6;39905-I;" ":NEXT
   I
KA 130 TEMP=RAMTOP-20:DM=256*TEMP:FOR I=1
   536 TO 1538:POKE I,112:NEXT I:BOTTOM=D
   M+2816
FU 140 FOR V=2 TO 110 STEP 37:RESTORE 400
   :FOR X=V TO V+36:POSITION 13,7:? #6;11
   2-X;" ":READ A,B,C,D,E,F,G,H
JK 145 POKE DM+256*4+X,A:POKE DM+256*5+X,
   B:POKE DM+256*6+X,C:POKE DM+256*7+X,D:
   POKE DM+256*8+X,E+100
EK 147 POKE DM+256*9+X,F:POKE DM+256*10+X
   ,G:POKE DM+256*11+X,H
NF 150 POKE DM+256*4+X+111,A:POKE DM+256*
   5+X+111,B:POKE DM+256*6+X+111,C:POKE D
   M+256*7+X+111,D
WS 154 POKE DM+256*8+X+111,E+100:POKE DM+
   256*9+X+111,F:POKE DM+256*10+X+111,G:P
   OKE DM+256*11+X+111,H:NEXT X:NEXT V
IW 200 RESTORE 205:FOR V=1 TO 6:READ O:PO
   KE DM+256*0+O,53:NEXT V
SE 205 DATA 20,58,97,133,168,206
JN 250 FOR C=224 TO 255:POKE DM+256*11+C,
   39:NEXT C
RN 255 FOR O=39 TO 200 STEP 37:POKE DM+25
   6*3+O,248:NEXT O:FOR O=38 TO 200 STEP
   37:POKE DM+256*3+O,247:NEXT O
PN 300 RESTORE 500:FOR I=1578 TO 1637:REA
   D A:POKE I,A:POSITION 13,8:? #6;1578+5
   9-I;" ":NEXT I
OQ 320 RESTORE 330:FOR T=1 TO 14:READ OI:
   POKE DM+256*0+OI,165:POKE DM+256*1+OI,
   166:POKE DM+256*2+OI,149:NEXT T
UG 330 DATA 25,35,46,69,79,92,103,127,137
   ,161,175,182,197,222
DM 340 POKE DM+256*3+222,248
WT 350 RESTORE 365:FOR N=41 TO 223 STEP 3
   7:READ OP:POKE DM+256*8+N,OP:POKE DM+2
   56*8+N+17,OP:POKE DM+256*8+N+29,OP
EP 360 NEXT N:POKE 559,0
IR 365 DATA 159,160,161,162,163
LC 370 POKE 1575,65:POKE 1576,0:POKE 1577
   ,6:POKE 560,0:POKE 561,6:POKE 764,255
CS 375 POKE 53256,1:POKE 53277,2:GOSUB 10
DF 380 POSITION 2,11:? #6;"loading PART T
   WO":RUN "D:CRAZY":REM CASSETTE USERS u
   se RUN "C:"
LC 399 REM  *** TRAIN DATA ***
UV 400 DATA 2,3,3,3,-76,170,48,39,1,68,69
   ,69,33,43,1,49,1,70,71,65,58,44,1,50,1
   ,72,73,74,42,45,1,51,1,75,0,76,29,45
MB 401 DATA 1,39,1,75,0,76,29,46,1,39,1,7
   5,0,76,29,47,1,39,1,77,78,79,29,43,1,3
   9,1,80,81,82,29,43,1,49,1,75,0,76,29
ZJ 402 DATA 44,1,50,1,75,0,76,29,45,1,51,
   1,75,0,76,29,25,0,39,1,77,78,79,29,1,2
   5,39,1,80,81,82,29,1,25,39,1,75,0,76
IG 403 DATA 29,1,25,39,1,75,0,76,29,1,25,
   39,1,75,0,76,29,1,25,39,1,77,78,79,29,
   1,25,39,1,68,69,69,33,1,25,39,1,70
BC 404 DATA 71,65,58,1,25,39,1,72,73,74,4
   2,1,25,39,1,75,0,76,29,1,25,39,1,75,0,
   76,29,1,25,39,1,75,0,76,29,1,25,39,1
CC 405 DATA 77,78,79,29,1,25,39,1,80,81,8
   2,29,25,0,39,1,75,0,76,29,43,1,49,1,75
   ,0,76,29,44,1,50,1,75,0,76,29,45,1,51
TV 406 DATA 1,77,78,79,29,45,1,39,1,68,69
   ,69,33,46,1,39,1,70,71,65,58,47,1,39,1
   ,72,73,74,42,43,1,39,1,75,0,76,29,43
QR 407 DATA 1,49,1,75,0,76,29,44,1,50,1,7
   7,78,79,29,45,1,51,26,27,27,27,-72,169
   ,52,39
YQ 499 REM  *** SCROLL DATA ***
JT 500 DATA 104,169,0,133,203,141,4,212,1
   60,59,162,6,169,7,76,92
UU 501 DATA 228,198,203,165,203,141,4,212
   ,16,31,169,7,133,203
QP 502 DATA 141,4,212,238,4,6,173,4,6,201
   ,234,208,2,169,0,162
KS 503 DATA 0,157,4,6,232,232,232,224,39,
   208,246,76,98,228
ZZ 599 REM  *** CHARACTER DATA ***
JD 999 REM
GI 2000 DATA 0,0,0,0,0,0,0,0,255,255,255,
   255,255,255,255,255,0,7,29,117,85,85,8
   5,85,85,85,85,85,85,85,85,85,252,253
SV 2001 DATA 253,253,253,253,253,253,253,
   253,253,253,253,253,253,253,0,255,255,
   131,131,131,131,131,255,131,131,131
SG 2002 DATA 131,131,131,131,127,127,126,
   126,126,126,126,127,126,126,126,126,12
   6,126,126,126,126,126,126,126,126
NN 2003 DATA 127,127,127,255,24,24,24,24,
   24,24,255,0,0,0,0,0,255,255,255,255,
   127,127,127,127,127,255,127,127,127
NQ 2004 DATA 127,127,127,127,127,127,127,
   127,127,127,255,255,255,255,255,254,25
   4,254,254,254,255,254,254,254,254
MY 2005 DATA 254,254,254,254,254,254,254,
   254,254,255,255,255,127,127,127,127,25
   5,255,255,255,255,255,255,127,127,127
SF 2006 DATA 127,127,56,16,56,16,0,0,0,0,
   0,255,255,255,255,255,255,0,127,12
   7,127,127,127,127,127,85,85,85,85
AD 2007 DATA 85,85,127,255,255,255,255,25
   5,0,0,0,0,224,184,174,170,170,170,170,
   170,170,170,170,170,170,170,170,170
HP 2008 DATA 170,170,170,170,170,170,254,
   255,195,153,145,137,153,195,255,255,23
   1,199,231,231,231,129,255,255,195,153
ZG 2009 DATA 243,231,207,129,255,255,129,
   243,231,243,153,195,255,255,243,227,19
   5,147,129,243,255,255,129,159,131,249
ZO 2010 DATA 153,195,255,255,195,159,131,
   153,153,195,255,0,0,0,0,0,0,255,254,
   16,56,40,56,16,56,40,56,16,56,40
ZK 2011 DATA 56,16,56,40,0,0,0,0,255,0,25
   5,255,16,40,68,130,68,40,16,0,0,224,63
   ,249,15,0,0,0,0,7,252,207,112,0,0,0
HR 2012 DATA 255,255,255,255,255,0,0,1,25
   5,255,255,255,255,0,126,255,255,255,25
   5,255,255,0,0,128,255,255,255,255,255
SV 2013 DATA 15,31,255,255,255,255,255,25
```

```
   5,240,248,255,0,0,255,255,143,15,0,0,1
   27,3,1,0,255,0,255,255,255,255,255
QV 2014 DATA 126,255,0,255,255,254,192,12
   8,0,255,0,255,255,0,0,255,255,241,240,
   0,0,254,16,124,16,56,16,56,16,0,255
KO 2015 DATA 255,255,255,255,255,128,0,0,
   0,0,0,0,0,132,0,0,0,0,0,0,33,0,0,0,0
   ,0,0,124,254,16,56,124,254,124
JU 2059 DATA 56,16,0,127,127,127,127,127,
   127,62,0
ZC 2060 DATA 0,63,127,127,127,127,127,127
FA 2061 DATA 0,255,255,255,255,255,255,0
BL 2062 DATA 0,240,252,254,254,255,255,25
   5
PC 2063 DATA 0,0,0,0,255,255,255,255
EG 2064 DATA 127,127,127,127,254,254,252,
   248
VT 2065 DATA 255,255,255,0,0,0,0,0
CP 2066 DATA 254,255,255,255,127,127,127,
   127
EV 2067 DATA 0,7,31,63,63,127,127,127
BR 2068 DATA 255,255,255,127,127,127,127,
   127
AQ 2069 DATA 127,255,255,255,255,255,255,
   0
YR 2070 DATA 0,62,127,127,127,127,127,127
OD 2071 DATA 0,0,0,128,192,224,240,248
XN 2072 DATA 252,254,255,255,255,127,63,3
   1
EW 2073 DATA 15,7,3,1,0,0,0,0
KZ 2074 DATA 127,127,255,255,255,255,255,
   255
FC 2075 DATA 255,255,255,255,255,127,127,
   127
WJ 2076 DATA 127,127,127,63,63,31,7,0
GL 2077 DATA 127,127,127,62,0,0,0,0
WV 2078 DATA 0,0,0,0,62,127,127,127
NE 2079 DATA 255,255,255,254,254,252,240,
   0
JJ 2080 DATA 0,255,255,255,255,255,255,3
CQ 2081 DATA 0,254,255,255,255,255,254,25
   2
DK 2082 DATA 3,7,15,15,31,63,63,127
ZR 2083 DATA 248,248,240,224,224,192,128,
   128
SF 2084 DATA 0,1,1,3,7,7,15,31
NF 2085 DATA 255,254,252,252,248,240,240,
   224
EQ 2086 DATA 31,63,127,127,127,127,63,0
BH 2087 DATA 192,255,255,255,255,255,255,
   0
LW 2088 DATA 127,63,63,31,15,7,3,1
KW 2089 DATA 0,128,193,227,247,255,255,25
   5
WK 2090 DATA 127,254,254,252,248,240,224,
   192
EF 2091 DATA 198,124,124,198,198,192,192,
   198
UN 2092 DATA 198,124,124,198,198,198,198,
   198
LU 2093 DATA 192,254,192,192,192,192,192,
   192
IH 2094 DATA 24,126,126,24,24,24,24,24
CK 2095 DATA 198,198,198,230,246,254,222,
   206
OT 2096 DATA 192,192,254,192,192,248,192,
   192
SI 2097 DATA 198,198,124,198,198,198,254,
   198
OM 2098 DATA 192,254,254,192,192,248,192,
   192
XN 2099 DATA 204,198,252,198,198,198,252,
   216
LN 2100 DATA 0,63,127,127,127,127,63,0
FK 2101 DATA 0,255,255,255,255,255,255,12
   7
UY 2102 DATA 0,252,254,254,254,254,252,0
WY 2103 DATA 127,127,127,127,127,127,127,
   127
LM 2104 DATA 252,198,198,204,198,198,252,
   0
DD 2105 DATA 195,195,102,60,24,24,24,0
PM 2110 DATA 198,126,124,198,192,192,222,
   198
IH 2111 DATA 24,24,198,198,198,110,60,24
UN 2112 DATA 0,0,126,126,126,126,126,126
LI 2113 DATA 56,16,198,198,198,198,198,10
   8
JR 2114 DATA 198,124,124,198,192,124,6,6
MG 2200 DATA 204,248,248,204,198,198,198,
   198
YK 2201 DATA 198,198,198,238,254,254,214,
   198
FT 2202 DATA 24,126,24,56,120,24,24,24
ZF 2203 DATA 192,254,124,198,6,12,56,96
OC 2204 DATA 198,124,124,198,6,28,6,6
ZL 2205 DATA 12,12,12,28,60,108,204,254
JO 2206 DATA 198,124,254,192,192,252,6,6
CC 2222 DATA 0,85,0,0,0,0,0,0
AM 2223 DATA 0,0,0,0,0,0,0,0
```

```
CS 1 REM ################################
SM 2 REM #      TRAIN CRAZY Pt.2        #
ZV 3 REM #             by               #
GV 4 REM #        COLIN FALLER          #
SG 5 REM # ---------------------------- #
XD 6 REM #  PAGE 6 MAGAZINE - ENGLAND   #
CY 7 REM ################################
NN 8 REM
UP 9 POKE 2,52:POKE 3,185:POKE 9,2:TRAP 3
   0000:REM FOR 400/800 USE POKE 2,64 ins
   tead of POKE 2,52
HR 10 POKE 559,0
QF 11 POKE 53248,0:POKE 53250,0:POKE 5325
   1,0:POKE 53249,0:LEV=0:SC=0:LI=6:LP=0:
   Q=0:GH=0:BA=5:CX=32:GOTO 50
WV 12 RESTORE 13:FOR V=1 TO 6:READ O:POKE
   DM+256*1+O,104:NEXT V
ML 13 DATA 20,58,97,133,168,206
LQ 14 FOR T=38 TO 200 STEP 37:POKE DM+256
   *3+T,247:POKE DM+256*3+T+1,248:NEXT T
IP 15 GRAPHICS 0:POKE 559,0:POKE 82,0:RES
   TORE 30:DL=PEEK(560)+PEEK(561)*256+3:P
   OKE 752,1:P=USR(1578)
MX 20 POKE DL,70:POKE 560,35:FOR A=3 TO 1
   9:READ B:POKE DL+A,B:NEXT A
WV 30 DATA 2,2,2,2,2,2,3,2,6,14,10,6,1,15
   ,6,3,7
BO 40 POSITION 32,0:? "jkl\]~┘V^jkl╱╲╱  ┘
   ]^\]~┘V^j┼r/ /";:? ,"        M M_♥M_3 M
    M▲   M ‾M_♥M_3 ─┼─┤ └";
WK 45 ? ,"          M M├ |M├4  M M▪"  M _M├ |M├
   4●▬  M";:? ,"          [ [ [[ [j┐l[ [  ▪
   ]▪ [ [[ [| ┬l [":POKE 623,2
WV 46 POSITION 24,5:? "||||||||||||||||||
   ||||||||||||||":POSITION 7,7:? "no"
UE 47 POSITION 10,8:? "abcde  fgcchi":POS
   ITION 18,9:? "||||||||||||||":GOTO 65
AY 50 RAMTOP=PEEK(106)
BR 51 START=RAMTOP-8:CH=256*START:POKE 75
   6,START
SI 52 TEMP=RAMTOP-20:DM=256*TEMP:FOR I=15
   36 TO 1538:POKE I,112:NEXT I
VP 53 FOR I=1539 TO 1572 STEP 3:POKE I,87
   :POKE I+1,0:POKE I+2,TEMP:TEMP=TEMP+1:
   NEXT I:GOTO 12
RM 65 POSITION 1,0:? "▣▚+▣▚+▣▚+▣▚+▣▚
   +▣▀":POSITION 8,10:? "▙▣▚+▣▚+▣▚+▣▚
   +▣▚+▣▀"
IV 90 RAMTOP=PEEK(106):SETCOLOR 0,0,0:SET
   COLOR 4,13,8:SETCOLOR 1,1,14:SETCOLOR
   3,6,6:SETCOLOR 2,9,4
CD 95 START=RAMTOP-8:CH=256*START:POKE 75
   6,START
MY 98 GOTO 110
```

```
XE 100 POSITION 1,0:? "▣▙+▣▙+▣▙+▣▙+▣"
   ▙+▣"":POSITION 9,10:? "▙▣▙+▣▙+▣▙+▣"
   ▙+▣▙+▣"";GOSUB 105
SU 101 POSITION 1,0:? "+▣▙+▣▙+▣▙+▣▙+▣
   ▙+▣":POSITION 9,10:? "▣▙+▣▙+▣▙+▣▙
   +▣▙+▣"";GOSUB 105
WD 102 POSITION 1,0:? "▙+▣▙+▣▙+▣▙+▣▙+
   ▣▙+":POSITION 9,10:? "▙+▣▙+▣▙+▣▙+
   ▣▙+▣▙";GOSUB 105
NX 103 POSITION 1,0:? "▙+▣▙+▣▙+▣▙+▣▙
   +▣▙":POSITION 9,10:? "▙+▣▙+▣▙+▣▙+▣
   ▙+▣▙+";GOSUB 105:GOTO 100
GW 105 IF PEEK(53279)=6 THEN GOTO 290
JQ 107 IF STRIG(0)=0 THEN GOTO 290
TZ 108 AS=AS+128:BGT=4:IF AS=256 THEN AS=
   0:BGT=BGT=0
OP 109 SOUND 1,AS,8,BGT:RETURN
XT 110 DIM PM$(2048)
JF 120 PM$(1)=CHR$(0):PM$(2048)=CHR$(0):P
   M$(2)=PM$
UR 130 DIM C$(128):C$(1)=CHR$(0):C$(128)=
   CHR$(0):C$(2)=C$
YB 140 DIM P$(170):POKE 559,35
XV 150 RESTORE 170:FOR L=1 TO 160 STEP 7:
   READ A,B,C,D,E,F,G:CA=CA+128
RQ 160 P$(L,L)=CHR$(A):P$(L+1,L+1)=CHR$(B
   ):P$(L+2,L+2)=CHR$(C):P$(L+3,L+3)=CHR$
   (D):P$(L+4,L+4)=CHR$(E)
MA 164 P$(L+5,L+5)=CHR$(F):P$(L+6,L+6)=CH
   R$(G):SOUND 1,CA,8,4:NEXT L
PF 165 SOUND 1,50,10,3:FOR T=1 TO 75
HC 166 NEXT T:SOUND 1,0,0,0:FOR T=1 TO 75
   :NEXT T:SOUND 1,50,10,3
AK 170 DATA 0,0,0,0,24,52,63,60,152,216,2
   20,124,60,24,52,98,130,131,0,0
VC 171 DATA 0,0,0,48,104,126,120,152,220,
   220,124,56,24,56,208,136,12,0,0,0
BU 172 DATA 0,0,0,24,52,63,60,152,216,220
   ,124,60,24,24,112,80,24,0,0
QE 173 DATA 0,0,0,24,52,63,60,152,216,220
   ,124,60,8,8,8,8,28,0,0
XV 174 DATA 0,0,0,24,52,63,60,152,216,220
   ,124,60,24,28,52,34,51,0,0
QJ 175 DATA 0,0,0,0,0,24,52,63,60,152,220
   ,124,60,8,8,8,28,0,0,0,0
QX 176 DATA 255,255,255,255,255,255,255,2
   55,255,255,255,255,255,255,255,255,255
   ,255,255,255
YS 177 DATA 255,255,255,255,255,255,254,2
   54,252,252,248,248,240,240,224,224,192
   ,192,0,0
AZ 190 A=ADR(PM$)
QN 200 PMBASE=INT(A/1024)*1024
VN 210 IF PMBASE<A THEN PMBASE=PMBASE+102
   4
DV 220 S=PMBASE-A
UR 230 POKE 54279,PMBASE/256
ZV 240 P0=S+512:P1=S+640:P2=S+768:P3=S+89
   6
JV 250 POKE 53257,2:POKE 705,61:POKE 559,
   43:POKE 53277,2
BP 260 POKE 53249,0:Y=34:I=58
UL 270 PM$(P1+Y,P1+Y+19)=P$(I,I+19)
MI 280 POKE 764,255:POKE 704,18:POKE 706,
   16:POKE 707,18:POKE 53248,0:POKE 53251
   ,0:POKE 53250,0
PR 282 I=139
YX 283 POKE 53256,1:POKE 53258,1:POKE 532
   59,1
RE 284 FOR U=0 TO 90 STEP 20:PM$(P2+U,P2+
   U+19)=P$(120,I):NEXT U
TI 285 FOR U=0 TO 80 STEP 20:PM$(P3+U,P3+
   U+19)=P$(120,I):NEXT U
HT 286 FOR U=0 TO 100 STEP 20:PM$(P0+U,P0
   +U+19)=P$(120,I):NEXT U
YS 287 PM$(P3+82,P3+82+19)=P$(140,140+19)
   :PM$(P0+113,P0+113+10)=P$(I,I+10)
LZ 289 FOR T=1 TO 43 STEP 3:POKE 53248,T:
   POKE 53250,13+T:POKE 53251,27+T:NEXT T
   :GOTO 100
JY 290 SOUND 1,50,10,3:FOR T=1 TO 75:NEXT
   T:SOUND 1,0,0,0:FOR T=1 TO 75:NEXT T:
   SOUND 1,50,10,3
WD 300 RAMTOP=PEEK(106)
PC 310 START=RAMTOP-8:CH=256*START:POKE 7
   56,START
JQ 320 TEMP=RAMTOP-20:DM=256*TEMP:FOR I=1
   536 TO 1538:POKE I,112:NEXT I:POKE 559
   ,0
JJ 321 POKE 623,2:POKE 53277,2:U=USR(1578
   ):? "K"
LU 323 POSITION 28,0:? "━━━━━━━━━━━━━━━━━
   ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━";
DE 325 ? "          hehipq rrrrrrrrrrrrrrr
   rrrrrrrrrrr"
FE 326 POSITION 14,4:? "━━━━━━━━━━━━━━━━━
   ━━━━━━━━━━━━━━━━━━━━━━━━━━━━    udgvbe
   ut H H H H H H    cdsht ♠"
CT 327 POSITION 37,7:? "━━━━━━━━━━━━━━━━━
   ━━━━━━━━━━━━━━━━━━━━━━━━━━━┳┳┳┳┳┳┳┳┳┳┳
   ┳┳┳┳┳┳┳┳┳┳┳┳┳┳┳┳┳┳┳┳┳┳";
XE 328 ? "━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━
   ━━━━━━━━━━━━"
LH 330 FOR I=1539 TO 1572 STEP 3:POKE I,8
   7:POKE I+1,0:POKE I+2,TEMP:TEMP=TEMP+1
   :NEXT I
NH 333 RESTORE 335:FOR N=1 TO 20:READ OP:
   POKE DM+256*3+OP,0:NEXT N:SOUND 1,0,0,
   0
RM 335 DATA 53,87,156,140,100,118,170,191
   ,28,134,178,211,20,61,123,201,43,145,1
   64,206
EM 340 SETCOLOR 1,1,14:SETCOLOR 4,13,8:SE
   TCOLOR 0,0,0:SETCOLOR 3,13,8:SETCOLOR
   2,9,4
FJ 365 RESTORE 366:POKE DL,76:POKE 560,35
   :FOR A=3 TO 14:READ B:POKE DL+A,B:NEXT
   A:POKE 559,43
DI 366 DATA 14,3,15,14,3,15,14,10,14,1,3,
   6
DY 400 POKE 764,255:POKE 53249,90:TT=0:ZX
   =0:POKE 752,1
JF 420 TT=0:Y=34:X=90:I=1:SC=SC+X
WX 421 POKE 53278,0:SOUND 1,0,0,0
ON 422 O=O+1:IF O=7 THEN TT=TT+1:POSITION
   34-TT+ZX,2:? " ":O=0:IF TT-ZX=28 THEN
   3000
PG 423 S=STICK(0):IF S=14 THEN GOTO 600
MH 431 IF S=13 THEN I=96:X=X-1:GOTO 470
ZE 433 IF STRIG(0)=0 THEN X=X+1:GOTO 455
LR 444 GOTO 5000
BR 455 IF X>160 THEN X=160
VB 459 I=I+19:IF I>78 THEN SOUND 1,250,10
   ,8:I=1:SC=SC+12:SOUND 1,0,0,0
NJ 460 GOTO 500
PO 470 IF X<53 THEN GOTO 3000
RP 500 POKE 53249,X
UC 510 PM$(P1+Y,P1+Y+19)=P$(I,I+19)
LR 515 IF PEEK(53252)>10 THEN 20000
AL 516 IF PEEK(53253)>0 THEN 10000
OM 520 GOTO 422
SB 600 I=3:V=230:FOR Y=36 TO 22 STEP -2:V
   =V-10:SOUND 1,V,10,5:IF PEEK(53253)>0
   THEN 10000
IH 610 PM$(P1+Y,P1+Y+19)=P$(I,I+19):NEXT
   Y
DD 620 I=3:V=120:FOR Y=22 TO 37 STEP 2:V=
   V+10:SOUND 1,V,10,5:IF PEEK(53253)>0 T
   HEN 3000
IL 630 PM$(P1+Y,P1+Y+19)=P$(I,I+19):NEXT
   Y
VB 635 I=58:PM$(P1+34,P1+53)=P$(I,I+19)
IM 700 Y=34:I=58:SOUND 1,0,0,0:GOTO 422
UZ 900 POKE DM+256*3+222,0:I=3:FOR Y=37 T
   O 30 STEP -1:SOUND 1,Y+Y+Y+Y+Y+Y+Y,10,
   5
IK 910 PM$(P1+Y,P1+Y+19)=P$(I,I+19):NEXT
   Y
```

```
KZ 920 I=22:FOR Y=30 TO 90 STEP 2:SOUND 1
   ,Y+Y,10,5
JG 922 I=I+19:IF I>78 THEN I=1
IO 930 PM$(P1+Y,P1+Y+19)=P$(I,I+19):NEXT
   Y
UV 2000 GRAPHICS 2+16:POKE 559,0:SETCOLOR
   0,1,14:SETCOLOR 4,13,8:SETCOLOR 1,0,0
   :SETCOLOR 3,6,6:SETCOLOR 2,9,4
TX 2005 LEV=LEV+1:? #6;"        WeLL DoNE"
   :? #6;""
AF 2010 ? #6;"         LEveL ";LEV:? #6;""
DT 2020 ? #6;"         sCORe ";INT(SC)+215:?
   #6;""
XH 2022 ? #6;"         LiVES ";LI-1
RF 2050 POKE 705,61:POKE 559,42
OU 2060 I=22:FOR Y=X TO 222:POKE 53249,Y:
   SOUND 1,0,0,0
RR 2070 I=I+19:IF I>78 THEN SOUND 1,250,1
   0,5:I=1
BZ 2080 PM$(P1+90,P1+90+19)=P$(I,I+19):PO
   SITION 12,4:? #6;INT(SC+Y):NEXT Y
UY 2090 I=115:FOR Y=10 TO 128 STEP 5
DY 2095 PM$(P1+Y,P1+Y+19)=P$(I,I+19):NEXT
   Y:SOUND 1,0,0,0:POSITION 12,2:? #6;LE
   V+1
GN 2098 POSITION 7,8:? #6;"GoOD LuCK":POS
   ITION 12,2:? #6;LEV+1:CY=0
VS 2099 FOR Y=0 TO 100:CY=CY+86:SOUND 1,C
   Y,10,6:NEXT Y:LL=LL+1:SOUND 1,0,0,0
CB 2130 IF LL=6 THEN LL=1
TA 2200 RESTORE 2250+LL:FOR N=1 TO 4:READ
   OP:POKE DM+256*3+OP,185:NEXT N:POKE 5
   59,0
BW 2210 GRAPHICS 0:POKE 559,0:RAMTOP=PEEK
   (106)
ES 2220 START=RAMTOP-8:CH=256*START:POKE
   756,START
DR 2225 TEMP=RAMTOP-20:DM=256*TEMP:FOR I=
   1536 TO 1538:POKE I,112:NEXT I
PO 2230 FOR I=1539 TO 1572 STEP 3:POKE I,
   87:POKE I+1,0:POKE I+2,TEMP:TEMP=TEMP+
   1:NEXT I:GOSUB 2300:GOTO 340
YL 2251 DATA 53,87,156,140
IW 2252 DATA 100,118,170,191
QY 2253 DATA 28,134,178,211
LT 2254 DATA 20,61,123,201
QX 2255 DATA 43,145,164,206
UR 2300 POKE DM+256*3+222,248:POSITION 28
   ,0:? "▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬
   ▬▬▬▬▬▬▬▬▬▬▬▬▬▬";
BX 2310 ? "     hehipq rrrrrrrrrrrrrr
   rrrrrrrrrrrr"
CY 2320 POSITION 14,4:? "▬▬▬▬▬▬▬▬▬▬▬▬
   ▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬     udgvb
   eut H H H H H H"
JG 2321 POSITION 12+BN,6:? "♠zyxw":POSITI
   ON 6,6:? "cdsht ":POSITION 13,6:? "
   "
SH 2330 POSITION 37,7:? "▬▬▬▬▬▬▬▬▬▬▬▬
   ▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬
   ▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬";
NH 2340 ? "▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬
   ▬▬▬▬▬▬▬▬▬▬▬▬▬":POKE 705,61:LP=0:BA=5:CX=
   32
CJ 2350 RESTORE 2355:FOR V=1 TO 6:READ O:
   POKE DM+256*1+O,104:NEXT V:Q=0:GH=0
AJ 2353 DATA 20,58,97,133,168,206
HT 2360 FOR T=38 TO 200 STEP 37:POKE DM+2
   56*3+T,247:POKE DM+256*3+T+1,248:NEXT
   T:RETURN
IO 3000 FOR T=0 TO 255 STEP 15:POKE 705,T
   :SOUND 1,T,10,8:NEXT T
CA 3001 FOR T=255 TO 0 STEP -15:POKE 705,
   T:SOUND 1,T,10,8:NEXT T:SOUND 1,0,0,0:
   POKE 53249,0:LI=LI-1
VE 3002 GRAPHICS 2+16:POKE 559,0:SETCOLOR
   0,1,14:SETCOLOR 4,13,8:SETCOLOR 1,0,0
   :SETCOLOR 3,6,6:SETCOLOR 2,9,4
NI 3005 ? #6;"         baD LuCK":? #6;""
DD 3010 ? #6;"         LEveL ";LEV+1:? #6;""
DU 3020 ? #6;"         sCORe ";INT(SC)+215:?
   #6;""
YR 3025 ? #6;"         LiVES ";LI
ZJ 3026 POKE 559,42:FOR U=1 TO 200:NEXT U
   :IF LI=1 THEN POSITION 12,6:? #6;"0":F
   OR UO=1 TO 200:NEXT UO:GOTO 4000
UZ 3090 I=115:FOR Y=10 TO 128 STEP 5
HC 3095 PM$(P1+Y,P1+Y+19)=P$(I,I+19):NEXT
   Y:POSITION 12,6:? #6;LI-1
OD 3098 POSITION 7,8:? #6;"GoOD LuCK"
ZE 3099 FOR Y=2400 TO 0 STEP -25:SOUND 1,
   Y+Y,10,6:NEXT Y:POKE 559,0:BN=BN-1:GOT
   O 2210
ZD 4000 GRAPHICS 2+16:POKE 559,0:SETCOLOR
   0,0,0:SETCOLOR 4,13,8:SETCOLOR 1,1,14
   :SETCOLOR 3,6,6:SETCOLOR 2,9,4:V=0
YK 4001 POKE 559,43
KM 4005 FOR T=2 TO 12:V=V+128:FOR O=0 TO
   8:NEXT O:SOUND 1,V,8,6:POSITION T,1:?
   #6;" GAmE":NEXT T:POSITION 13,1
WQ 4006 ? #6;"     ":POSITION 9,0:? #6;"G
   AmE"
JI 4007 FOR T=2 TO 17:V=V+128:FOR O=0 TO
   8:NEXT O:SOUND 1,V,8,6:POSITION T,1:?
   #6;" OveR":NEXT T:POSITION 17,1
JX 4008 ? #6;"     ":POSITION 14,0:? #6;"
   OveR"
NB 4010 POKE 559,42:POSITION 7,0:? #6;"GA
   mE OveR  ":? #6;"":SOUND 1,0,0,0
AW 4030 ? #6;"         sCORe ";SC+215:? #6;"
   "
FK 4040 ? #6;"       PrESS STArT":? #6;""
QW 4045 ? #6;"       FOR a NeW GamE":? #6;"
   ":POKE 559,42:GOSUB 4050
ZX 4047 FOR YY=1 TO 15:POSITION 6,4:? #6;
   "       ":FOR T=1 TO 30:IF PEEK(53
   279)=6 THEN RUN
PL 4048 NEXT T:POSITION 6,4:? #6;"PrESS S
   TArT":FOR T=1 TO 30:IF PEEK(53279)=6 T
   HEN RUN
RY 4049 NEXT T:NEXT YY:RUN
GZ 4050 IF SC>15000 THEN POSITION 4,8:? #
   6;"EXCELLENT SCORE":RETURN
JW 4051 IF SC>10000 THEN POSITION 6,8:? #
   6;"GREAT SCORE":RETURN
GT 4052 IF SC>4000 THEN POSITION 7,8:? #6
   ;"good score":RETURN
PR 4053 IF SC<4000 THEN POSITION 7,8:? #6
   ;"try again":RETURN
LQ 5000 PM$(P1+Y,P1+Y+19)=P$(I,I+19)
XK 5001 I=58:X=X-2.4:S=STICK(0)
PG 5002 IF PEEK(53253)>0 THEN 10000
XT 5003 IF S=14 OR S=13 THEN 422
JF 5004 IF STRIG(0)=0 THEN X=X+1:GOTO 455
FS 5010 POKE 53249,X:IF X<53 THEN GOTO 30
   00
OT 5030 GOTO 5000
KG 9000 IF PEEK(53253)=2 THEN SC=SC+200:G
   OTO 9002
QF 9001 GOTO 620
WW 9002 RESTORE 9004+LP:READ O:POKE DM+25
   6*1+O,0:SOUND 1,50,10,8:IF LP=4 THEN C
   X=-8:BA=6
RT 9003 IF LP=5 THEN CX=-8:BA=6
GT 9004 DATA 20
LW 9005 DATA 58
NG 9006 DATA 97
HR 9007 DATA 133
LS 9008 DATA 168
IN 9009 DATA 206
YF 9010 POSITION CX+LP+LP,BA:? "Z"
DM 9011 I=3:V=120:ZX=ZX+3:POSITION 30-TT+
   ZX,2:? "rrr":O=0:FOR Z=Y TO 37 STEP 2:
   V=V+10:SOUND 1,V,10,5
YY 9020 PM$(P1+Z,P1+Z+19)=P$(I,I+19):NEXT
   Z:I=58
ON 9025 PM$(P1+34,P1+53)=P$(I,I+19):Y=34:
   GOTO 421
ZZ 10000 IF PEEK(53253)=8 AND LP=5 THEN 9
   00
GC 10001 IF PEEK(53253)>0 THEN 9000
ZY 20000 Q=Q+37:POKE DM+256*3+Q+2,0:POKE
   DM+256*3+Q+1,0:LP=LP+1:O=0:GOTO 421
GL 30000 RUN
```

# SHORT REVIEWS



## Jim Short reviews some recent releases

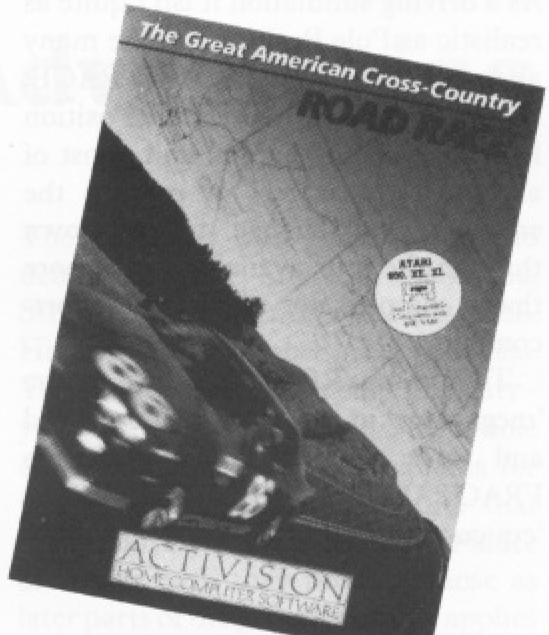
### GREAT AMERICAN CROSS COUNTRY ROAD RACE

**Activision**
**48K disk £14.95**
**48k cassette £9.95**
**1 player**
**Joystick**

Along with Broderbund, Activision has to be the most improved software house of the past year or so. Significantly, it was their recent UK release of the brilliant Lucasfilm range of games which rocketted them to the top of the 'Third Party' league (in my humble opinion, at any rate) and, with the quality of their own software improving all the time, a real 'killer' game was always on the cards. Well, it's finally arrived.

AMERICAN ROAD RACE is a high-speed racing game which knocks all other racing games for six. It might well have been based on the film 'Cannonball Run' such are the similarities between the two. Like the film, ROAD RACE is a city to city madcap excursion across America in which you must try to complete the journey in as quick a time as possible and, hopefully, add your name to that illustrious ROAD RACE scoreboard. Can you get your name in lights up there beside All American Al, Eastside Eddie, Move Over Mary and all the other hot-shot Road Racers? If you make it into the Top 10 your name will be slotted into the appropriate place on the board and you can then save that particular 'field' to tape or disk as a permanent record of your achievements.

The screen view is much the same as in Baja Buggies or Pole Position, though the scenery is far more spectacular and changes as you progress through the different States. The game would soon become monotonous if you had to suffer the same old background scenery, but the ever changing countryside gives an added interest as you carve your way through the deserts of New Mexico, the ice and snow of Colorado, and the lush green fields of New York State.




This isn't a race track so, naturally, the roads are crammed with other motorists (read 'pests') cruising along at the kind of speeds designed to set your nerves on edge as you try to weave your way through them at turbo-speed. Speaking of turbo-speed, your car is capable of 240mph (which leaves you wondering exactly what sort of car you are meant to be driving as not even a Group 5 Racing Porsche can reach those speeds!), so nothing on the road can touch you - not even old 'Smokey Bear' himself. A radar warns you of the presence of 'da fuzz', so get that pedal to the metal and, at 240mph, you'll blow dem Smokies off the road. You can also slow down to a respectable law-abiding speed (below 70mph) but anything in between will cost you a ticket and valuable race time.

At the outset you have the choice of four different routes with varying race lengths and degrees of difficulty. Three of these are West Coast to East Coast routes and the fourth is a slog round the whole of America visiting every single city on the map. The map is displayed at the start of each new game and at each stopping point along your chosen route. As well as relaying the obvious information, it also shows road conditions ahead and your current race position.

Just for added realism the road conditions vary from city to city and you will encounter ice & snow, fog, roadworks, potholes in the road, etc. as well as the obligatory night driving. As you may have gathered by now, this game's a real endurance test!

Obviously, you can't race all the way across America on one solitary tank of petrol and you have to make frequent stops at roadside Fuel Pumps to take on more gas. Stopping at these is quite tricky and should you miss one and subsequently run out of fuel, you'll have to 'push' the car to the next pump. This is also the penalty for revving too high in one gear and blowing your engine. All this wastes valuable time, so it's best to keep checking the instrument panel - located at the bottom of the screen - for signs of trouble. The instruments are clear and precise and include genuine rotary-dial speedometer and rev counters. None of this digital rubbish here!

In the race itself you have a set time in which to travel from one city to the next. The distance between each city varies considerably as does the amount of traffic on the road, but it always gets noticeably heavier as you hit the City Limits on each stage of your journey. All the cities have their own individual and, to the best of my knowledge, authentic skylines - the Statue of Liberty at New York, the mountains of Denver, the White House at Washington etc. - and greatly adds to the enjoyment of the

*continued overleaf*

game. It's even worth tackling the hazardous 'All Round Trip' in order to view the skylines of the individual cities on the map.

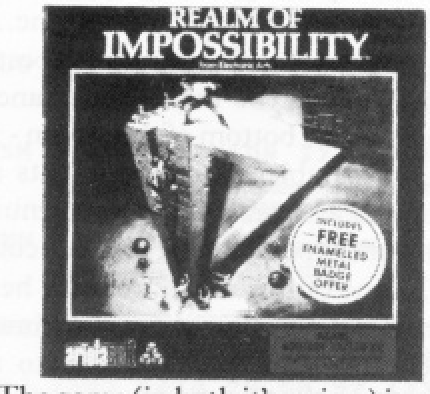
If I have any criticism at all about the game, it concerns the cars and motorbikes of the opposing traffic some of which aren't all that cleverly defined. As a driving simulation it isn't quite as realistic as Pole Position but the many and varied scenarios of ROAD RACE, the brute speed (it makes Pole Position look positively lethargic) and, most of all, the realistic feel of revving the engine as you change up and down through the four available gears more than compensates for any shortcomings.

To sum up, ROAD RACE is a true 'megagame' in every sense of the word and rates right up there alongside FRACTALUS and DROPZONE. Keep 'em coming Activision!!!

## REALM OF IMPOSSIBILITY

**Electronic Arts/Ariolasoft**
**48K disk £12.95**
**1/2 players**
**Joystick**

Anyone remember a game called ZOMBIES by Bram Incorporated? Bram are no longer in existence but Electronic Arts have taken Zombies, spruced it up a bit, added a few more levels and re-released it under the title REALM OF IMPOSSIBILITY.




The game (in both it's guises) is a 3-D dungeons & ladders game featuring a crudely defined, nameless character whose task it is to recover the seven crowns of the middle kingdom which have been stolen by an evil cleric called Wistrik and scattered throughout his dungeon stronghold.

There are 13 dungeons in all, each with it's own individual name. Some dungeons are locked others are not. Some contain the seven crowns whilst others contain keys to gain access to the locked dungeons. An options screen allows you to choose your starting dungeon, providing you stick to the unlocked variety.

All 13 dungeons are inhabited by creatures hell bent on your destruction - zombies (hence the original name of the game), spiders, snakes and killer orbs. You begin with a set number of 'Hit Points' and each time a creature contacts you, your points are reduced accordingly. If your hit points reach zero the game is over. Mercifully, you have a couple of 'secret weapons' at your disposal. Magic Crosses are undoubtedly the most useful. You drop these by pressing the firebutton and they keep the creatures at bay for vital seconds - just long enough to put some distance between you and the nasties. You also have the ability to cast spells which either freeze or confuse the creatures. However, in order to cast a spell you must first stand perfectly still, hold down the firebutton and then push the joystick in the desired direction. With a host of deadly creatures snapping at your heels the last thing you want to do is stand perfectly still and the only safe way to cast a spell is when the creatures are nowhere near you, which is a chronic waste of a good spell! As an alternative you can use the space bar although this is still not very satisfactory. Incidentally, you gain extra spells by collecting the magic scrolls which are dotted about here and there, but why bother when the spells are about as much use as a used teabag anyway?

Each dungeon is beautifully drawn in intricate 3-D and the author must have taken months to design them all. What a pity the rest of the game doesn't match up. A two player co-operative mode does little to haul gameplay above the mediocrity level. Animation, particularly of the main character, is crude and downright unprofessional, the use of colour leaves a lot to be desired and, quite honestly, the whole game looks dated and completely out of touch with what is happening in the software world right now.

Both Electronic Arts and Ariolasoft have been responsible for bringing some top quality software to these shores. Bearing that in mind, I therefore can't see the attraction of this game. If only Ariolasoft would release the likes of Broderbund's KARATEKA. Now that would be something!!!

## SPY HUNTER

**Sega/US Gold**
**48k disk £14.95**
**48k cassette £9.95**
**1/2 players**
**1/2 joysticks**
**keyboard**




Most people would agree that, with few exceptions, the Americans still lead the field in top quality software with Lucasfilm, Synapse, First Star and, lately, Activision and Broderbund showing everyone else how it should be done. Some way below this elite group come the likes of Sega.

Sega are a company who baffle me. Despite years of Atari experience they have yet to produce a game which can be classed as even moderately exceptional. True, they make great arcade games but their Atari computer conversions are invariably sub-standard due to the fact, no doubt, that they persist in cramming them into 16K Rom cartridges - but then again Activision, Parker Bros and even Atari themselves have produced some brilliant Roms in their time, so where does that leave Sega?

Anyway, SPY HUNTER is yet another arcade conversion which initially found it's way onto the Atari via a 16K Rom and has subsequently been downloaded onto cassette so that it now masquerades as a 48K program. Surprisingly enough, it's actually quite good.

SPY HUNTER is a driving game with a 'James Bond' type spy theme. The life of a world class master spy is not a cushy one as any budding James Bond will tell you and, in this game, you must endeavour to drive your spy-mobile down a busy highway, chased by an endless string of psychopathic killers with equally psychopathic names such as the Switch Blade, the Enforcer, Doctor Torpedo and the Mad Bomber.

Your spy-mobile is equipped with an arsenal of deadly weapons to help you dispose of your enemies and extra weapons are gained by driving your car, Knight Rider style, into the backs of

various moving trucks which appear at strategic points along the highway. As far as I can gather, the sole aim of the game is to survive for as long as possible. This largely consists of destroying all your enemies by shooting them or driving them off the road, whilst trying to prevent them doing likewise to you!

The screen shows a plan view of the proceedings with the action taking place over a constantly scrolling landscape, featuring some fast vertical scrolling of ultra-smooth proportions, which should be more than enough to turn owners of the jerky BBC Micro green with envy (if you've ever seen C.V.J. - 'Coarse Vertical Jerking' - on the BBC then you'll know what I'm talking about). And if that's not a bit of Atari one-upmanship then I don't know what is!!

As if you didn't have enough trouble to contend with - what with raving lunatics dropping bombs on you from passing helicopters or trying to shred your tyres with their buzz-saw hubcaps - the terrain changes at regular intervals and throws up forks in the road and icy conditions just to keep you on your toes. Mind you, if you don't like it you can always abandon the road and take to the water. Simply drive through any boathouse and your car immediately becomes amphibious. I wouldn't recommend it though - the water is teeming with enemy agents.

Control is best via two joysticks. One can be used at a push but a couple of keyboard inputs are then necessary in order to use your full quota of weapons. This doesn't exactly make life simple but it does give you the chance to practise your one-handed driving technique!

SPY HUNTER isn't going to top the Atari software charts but it is an enjoyable game for all that. Well worth investigating.

## Coming . . .




# and JOHN SWEENEY goes Adventuring

**ALTERNATE REALITY - The City**
**Datasoft/U.S.Gold**
**48K Disk (2 disks) £16.95**
**Joystick/Keyboard**
**1 Player**

'The New Dimension in Role Playing Fantasy ... 3D scrolling screens -combined joystick and keyboard action - original music'. That's what the advertising blurb says. Sounds good... but the 3D scrolling is just like in Asylum (endless mazes on a square grid, with all the walls looking the same) and Ultima I (and we are now waiting for Ultima IV) had combined joystick and keyboard action. Yes, I suppose the music is original (although it is very reminiscent of the style of Passionately), but is it all enough to make a really good , new, exciting game?

While we are on the subject of the joystick I had better warn you not to believe the instructions which state that the joystick is optional. Deep inside the packaging you will find a last minute addition - a small piece of paper saying 'IMPORTANT NOTICE You need a JOYSTICK in this game. Without a joystick, you can't exit the Banks'. This is indeed true, and applies to numerous other situations as well, e.g. the Healer's if the Healer is not in. This failure to program a LEAVE command for the Bank highlights a major failing of the game and the instructions - not enough thought has gone into the interfaces between the game and the player and it has not been adequately tested to ensure that it is playable. I'll come back later to some of the games shortcomings, of which you should be aware if you are planning to buy Alternate Reality but first let's look at what it is all about and some of the good points.

Alternate Reality is a solo version of fairly standard Dungeons and Dragons. The computer throws some dice to determine your Stamina, Charisma, Strength, Intelligence, Wisdom, Skill, Hit Points and number of copper coins. You then set forth to explore the City - you start in the middle and the whole city contains about 3,800 squares for you to explore. Well not quite that many, since you can't enter the Palace or Arena until they produce those as later parts of the game (the same applies to the Wilderness outside the City and the Dungeon below it-. If we also exclude the Main Streets and Royale Walkway, which cut great swathes across the City and are mainly shown on the map provided with the game, that cuts it down to about 3,000 squares to explore and attempt to map. Since the City abounds with Secret Doors and One-Way Walls, usually in the most awkward places, trying to create a map of the place is the second biggest challenge in the game. Those who enjoy mazes will get plenty of fun. (Hints: Don't waste too much time looking for Secret Doors until you have explored around an area and have isolated some squares which appear to have no entrance. Make a couple of photocopies of the provided map and make sure you have a rubber handy! Practice walking along a wall and working out it's length in grid squares - I find that if I walk along with a wall on my left I can make out the joins between panels. If your compass keeps getting nicked try navigating by the sun or the distant mountains).

The biggest challenge is of course staying alive! Finding yourself in the middle of this strange City, the first thing you do is check your weaponry - you are immediately distressed to discover that you have no armour and are armed with nothing better than Bare Hands! But what is that sound over to the West? Could it be a Blacksmith

hammering and quenching? You hurry to the West and enter a Smithy. Two diskette changes and 35 seconds later you are rewarded with some very nice graphics of the Blacksmith hammering away, plus some excellent music as he sings you a song - the words flash up across one of the top lines on the screen. You check your funds and discover you have about 200 copper pieces, you enquire about the price of a sword and you get quite a shock when you discover that a sword costs 12,000 copper pieces! Even a dagger costs over 300, so you eventually decide to leave, empty handed (you could try bargaining for the dagger, but then what would you use to buy food, drink, lodgings and a compass?). You start to wander down the road when suddenly the screen flashes, music sounds and you are in the middle of an Encounter. It is a Courier. A menu appears on the lower part of the screen, the window in the middle of the screen (as usual full of lots of rectangular walls and buildings scrolling past) now has a small figure in the foreground. Various letters on the menu are flashing, offering you the chance of Hailing, Charming, Tricking, Engaging in combat, Leaving, etc. You decide to hail this friendly looking character and press H. You are surprised to find yourself dealt a swift blow with a short sword - 2 Hit Points gone - not very friendly round here are they? A for Attack - missed, Ouch! he got you again. P for Parry - missed again, so did he. L for Lunge - your Bare Hands have no effect. And so on... until you are dead. Unfortunately you can't restart in any way. You have to reload the whole game from the beginning. and that takes four minutes! (No it's not on tape, it takes four minutes to load from diskette! -Yes, I know you can load 48K in 48 seconds. - No I don't know what it does for the other three minutes!)

Anyway, Alternate Reality has most of the usual D&D elements -killing 'monsters' (i.e. anyone you meet!) results in you gaining Experience and, if you are lucky, money, jewels & gems (which you can sell at the bank), potions (varying from magical through harmless to deadly poison), weapons, etc. As your Experience increases you will suddenly find you have been granted a higher Level, along with suitable increments in your characteristics and Hit Points, so you can now fight bigger and nastier monsters and, hopefully, get bigger and better rewards, and more Experience so that you can fight even bigger and nastier monsters and ... That's a good question, what is the point of it all?

This is one of the flaws that I find with the game - after playing for a couple of weeks, and establishing a level 7 character with 27,000 Experience Points, 33 Hit Points, 35,000 in the bank, lots of weapons and potions, and twelve days experience of living in the City, I still have no clear idea of what I'm trying to achieve! I have mapped about 80% of the 3,000 squares, found about 70% of the establishments (Banks, Guilds, Shops, Armourers, Taverns, Inns, Healers - even the House of Ill-Repute and the Casino! - unfortunately the two latter establishments seem to have been permanently Closed By Order Of The Palace!), been refused entry by seven Guilds (Red Wizards, Blue Wizards, Thieves, Order, Assassins, and the Wizards of both Law and Chaos) on numerous occasions, listened carefully to the songs in all the best pubs and clubs (even those requiring you to join at extortionate cost!), and still don't know what my objective is, assuming that there is one. Is this game complete

in itself? Or do I have to get the next six parts in the series? Ah well, as long as one enjoys solo D&D one can set one's own objectives until something better comes along, like getting good enough to kill one of those Small Green Dragons I met last night (Small? -it filled most of the screen! (nice graphics) - best to avoid night time for your first few days in the City!), or getting one of the Guilds to accept me as a member.

More of the good aspects of the game. The graphics and sound effects are all of very high standard. As the sun moves across the sky the light changes, rain falls at times, obscuring your view, often accompanied by thunder and lightning. The wind howls. The amount of detail is very good in some cases. Your status, for instance has screens for each of: valuables and potions, current weapons/armour in use, rings, miscellaneous equipment, clothing, compass, weapons on belt and back, spells ready, active magic, work allocation, and ailments. If you get drunk (either in a tavern, or from drinking the wrong potion) the screen starts blacking out and the computer reacts uncertainly to your commands - great fun!

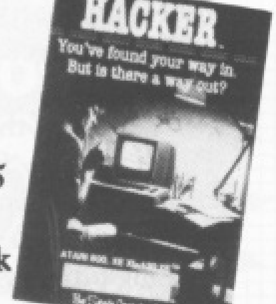
Now to the bad news. The biggest problem is the delays that they have built in to the program. For instance if you buy some food in a tavern the screen flashes up 'Right away!' and then pauses like that for five seconds -this means it takes about a minute to buy 6 flasks of water! When you check the time at an Inn it stays on screen for ten seconds (this is made even worse by the fact that it takes two diskette changes and associated pauses to get in and out of the Inn, so finding out the time actually takes nearly a whole minute!). These, and many other, unnecessary pauses (I am quite capable of pressing a key or button when I have finished reading a message, thank you very much), combined with much unnecessary diskette changes (for instance every time you try and enter a closed establishment) nearly put me off the game completely to start with. Initially I was waiting 15 seconds for each move in a fight - but fortunately discovered that this is one occasion (completely undocumented) where the space bar will cause the action to continue, cutting the time for a fight down from 2 or 3 minutes to a few seconds.

This major failing of intentionally wasting the player's time is compounded by lots of silly little things that could have been programmed better. For example, you have to hold the joystick button down when turning a corner, you can't tell whether you are still hungry or thirsty while in a tavern - you have to come outside to find out (two more unnecessary diskette changes!), you can't Pause the game while in a fight (what am I supposed to do if the phone rings, let the computer destroy the character I spent the last three hours building?), you can only buy a compass if you say you are NOT interested in a shop's wares, there is no documentation on how to use a potion if you have saved it (U for 'use' will do it at any time in fact), despite the fact that you can Hail people, nobody wants to talk - all they ever do is ignore you or fight you - gets a bit predictable after a bit, and so on.

The final problem is to do with the initial difficulty of the game and the ability to save. You CAN save your character, but when you reload him next time you play, the 'save data' is marked invalid so that if you die you can't reload him again. Now if I have spent two weeks getting my character up to level 7 and want to try him out against a Small(!) Green Dragon I am hardly likely to want to try it without taking a backup of him. The documentation tells you how to do this by using the Copy Utility on Diskette Two, BUT it takes ages to do - thirty seconds for the save plus four minutes for the game reload plus however long it takes to back up your character. (I only use one character on a diskette - he then only uses sectors 1 to 100 - and I can use a sector copier to have seven different backups of him on the back of the diskette). Since the whole point of the game is to have fun trying out new and dangerous things it is a bit silly to make it so time consuming to do so. The general we're- only- here- to- fight attitude of the game, together with the difficulty of 'saving' makes it very difficult to get anywhere to start with, and may well put off some of the less persevering games players, while the apparent lack of problems to solve (apart from staying alive and mapping I haven't found any thing to tax the old grey matter yet) may dissuade those who initially persevere from continuing.

Still, this is only the first in the series. Maybe if the authors listen to some of the feedback and give a bit more consideration to the playability of the game, subsequent modules of the game may be better, and Alternate Reality may earn its place on the shelves beside Ultima. If AR III is as much an improvement on AR1 as Ultima III was on Ultima I then
WOW!!!

## HACKER




**Activision**
**800 XL/XE only**
**64k Disk £14.95**
**64k Cassette £9.95**
**1 Player**
**Keyboard/Joystick**

"It's late and you've spent the night working electronic bulletin boards with your computer. You're ready to quit but decide to call up just one more. Being tired, you accidentally call the wrong number and, before you can hang up, your computer screen turns blue. The words "Logon please" appear. What do you do now? You don't know the password. You don't even know what computer you've hacked into. But you do know you want to find out more. How? You've found your way in. Now find your way out."

That's all it says on the box. So you hurry home with your purchase and discover the instructions inside the box aren't going to help, they tell you how to load it and nothing more. You load it into your Atari and sure enough the screen goes blue and says "LOGON PLEASE:". You are definitely on your own in this one!

Phase I.

It isn't too hard to get logged on so don't be put off by this.

Phase II.

Pictures of Robots? Screen instructions of how to use the joystick? A little perseverance will eventually see you through this one. Later on when you know how to log on properly this phase will be bypassed to allow you quicker access to...

Phase III.

A map of the world? What's this about time zones? Why is that thing in the South Atlantic flashing? Why are there no instructions? Why is it beeping at me? Why are the letters MSG flashing? What does PrgUpDnIrClIMg mean? Surely something on the key-

board or the joystick will have some effect? Yes, of course, but what?

This is the main part of the game. You will soon discover that fate has given YOU the chance to save the world from the machinations of a madman. Using both the keyboard and the joystick you will travel to exotic places and deal with strange men (nice little scrolling graphics windows here). Why does that Chinaman keep saying "Ni yo shun muh kum yee mai wuh duh dong shin"?

The game throws nasty little problems at you from time to time, to distract you from your mission. And just when you think you are finally making progress despite the computer, something else will go wrong - like the spy satellite which keeps catching you no matter how much you try to dodge it, and then asks you tricky little questions (what is the main password anyway? - you mean you haven't worked it out yet? - keep trying - it is a very fair game - if you play long enough you are sure to find out).

Then, after many, many attempts, you are, at last, on your way to your final destination, having completed all your tasks. Is it really over? No chance! Just before you get there you run out of time! What have you done wrong? Is it possible at all? Yes, it is. And as a reward for completing the game - once you have solved that last little problem, of course - it will display (and print if you have a suitable printer attached) tomorrow's Washington Post headlines telling how you saved the world! (Take notice Level 9 - if you put your games on diskette you too could provide nice endings like this!)

Nice graphics, good sound effects, clever puzzles, all in all a very pleasing little game. If only they could all be as original and entertaining as this! Although there are lots of graphics and the joystick is used for movement, there is no Arcade-style action requiring fast reflexes. The problem mentioned above about running out of time is solved by logic, NOT by trying to move faster.

So, if you are bored of zapping aliens, but not yet ready to abandon your joystick entirely in order to have a more cerebral challenge, why not have a go at Hacker? I can't really say any more about it without giving too much away. A lot of the fun comes from working out how it works for yourself. If I have said too much please forgive me.

## THE WORM IN PARADISE

**Level 9**
**64K Tape**
**(XL/XE only)**
**£9.95**
**1 Player**
**Keyboard**




The Worm in Paradise completes Level 9's Silicon Dream Trilogy. The previous two parts, Snowball and Return to Eden, set a high standard for cassette-based adventures. I am glad to say that the third part appears to be even better than the first two. Level 9 have continued to develop their adventure system, the game has optional graphics (admittedly fairly simple line drawings, but quite colourful and drawn very fast) and multi-tasking of picture drawing, text output, and keyboard input. This means that you don't have to wait for the computer to finish what it is doing before you can type your next command. You just keep keying as fast as you can - on this point they are even better than Infocom! They have also enhanced the game's ability to understand English. "EXAMINE ALL BUT THE HELMET, DUMMY AND LEOTARD AND GO EAST" is an example.

The game opens with "As the game starts, you can remember nothing. Most odd. You are in the Northwest corner of a garden paradise, protected by a high wall up which flowers climb. Bright butterflies flutter on the balmy breeze and skylarks sing overhead." OK, so here's the Paradise - where's the Worm? It shouldn't take you long to find it! And when you do you will find the land outside the wall is not a bit like Paradise - scarred hills and a desolate countryside, full of thornbushes and sand dunes. But don't worry about it if you don't find the Worm. Whether you do or not you will soon wake up anyway to discover that you were only dreaming. So on with the main part of the game.

You are a citizen of Enoch, megopolis of Eden. Your first problem is to map your way around Level 9's usual vast areas (200 plus) and learn how to negotiate all the one-way roads and roundabouts. This is made especially difficult in this game by the fact that the place is run by some very officious robots. All around you you will see uniformed citizens, speeding droids, and, unfortunately, too many fuzbots. The fuzbots are liable to fine you for just about anything you do, from the apparently innocuous - like carrying your badge instead of wearing it - to the more obvious - like breaking curfew or appearing nude in public! It is definitely not a friendly place! Since your funds are extremely limited, you are highly likely to end up in debt, whereupon you are carted away to the body bank, where you may sell your spare organs for credit!

Those who have played Return to Eden will recognise the Theme Park - it covers the area from the Shore of Death (no I haven't found a ticket for the Riverboat yet in this game!) and the Little House on the Prairie (now selling revolting pies) to the Old Curiousity Shop and Ancient Lankhmar. Likewise, those who have played Snowball will recognise the colour coding system of the One-Armed Bandit and the Eden Transport System. The latter has three main areas, each apparently serving one million dwellings! Movement around it is by no means obvious either, as you move from one location with a seven-colour code to another with a different, seemingly unrelated seven-colour code - but don't despair - it IS all logical and you CAN calculate an optimum route from one place to another. Mind you, with a choice of three million destinations, you had better know where you want to go! Trial and error is NOT recommended!

Your objective is to find out about the City of Enoch and progress within it, and of course to save the world (yet again!). Just how to go about this is not obvious. The Worm in Paradise is definitely not for the beginner. Assuming you have found the Worm, you can explore about 95 locations without solving any problems at all (plus the Eden Transport system and its 3,000,000 destinations if you want to!) but what then? There don't appear to be many clues. After many hours and much thought I have amassed about a quarter of the points, but it is hard work all the way. If you like adventures and are looking for a challenge, then you should definitely give this one a go.

The only criticism I would make is

*continued on page 55*

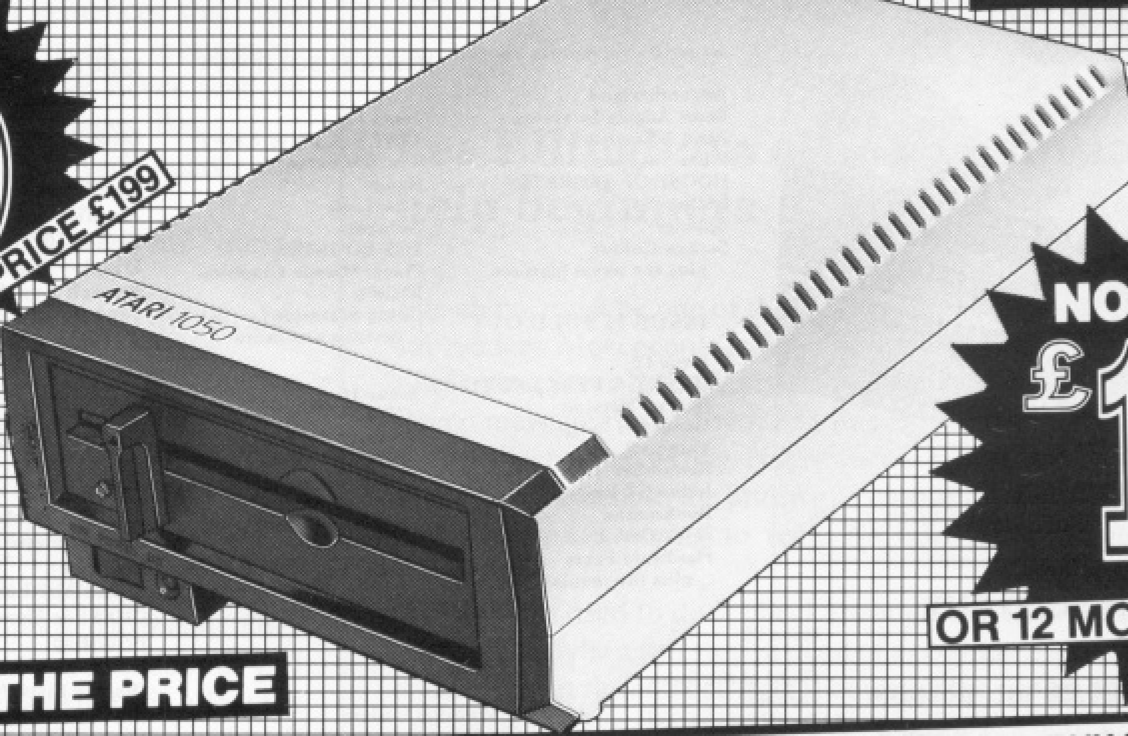
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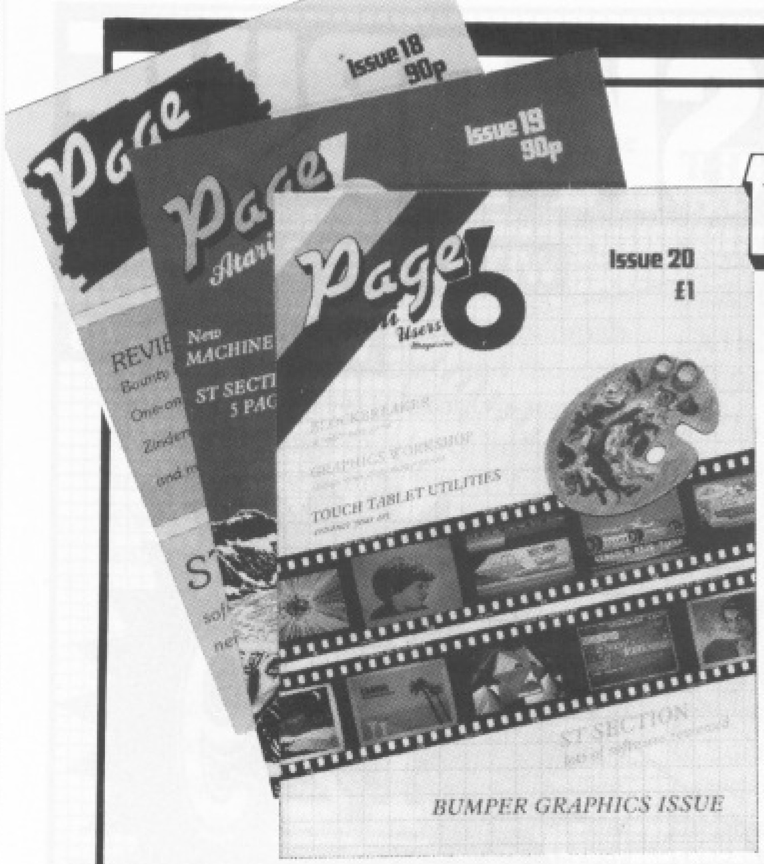
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that the program's understanding of English is not as good as they claim. "The most advanced English ever understood by a cassette-based game" MAY be true. But "copes with a wider range of English sentences than any other game we've seen" presumably means that they have never seen an Infocom game! Sequences like:

SEARCH - "that verb needs an object"
SEARCH ROOM - "room: dunno where it is"
SEARCH CRACK - "Dunno that verb"

can hardly be considered very friendly. Does it know the word SEARCH or not?

Likewise:

TURN NOZZLE - "You can't use the word 'turnstile' like that"

What is that supposed to mean? They claim 1000 plus word vocabulary. I think what they have done is allow the program to compare any input with all of the descriptive text, and pretend to understand it if it finds a match (hence 'turn' becomes 'turnstile'). They then can randomly reply "that's nothing special", "ignore it" or "that's just scenery" to 90% of your input. I suspect the USEFUL vocabulary is more like the couple of hundred words we are used to from Level 9. Personally I much prefer a program to be honest and admit when it doesn't understand a word. It makes it much more enjoyable to play. Similarly sequences like:

WEAR BROOCH - "You can't wear that"
PUT BROOCH ON TRADCLADS - "You can't put it there"
FASTEN BROOCH TO TRADCLADS - "OK"

are rather annoying (especially when FASTEN FLAG TO TRADCLADS gets the same response of "You can't PUT it there"!). Is it lack of thought on their part? Or just a desire to make us play guessing games?

But don't get me wrong. It is an excellent adventure in its class. It is impossible to equal the best of the diskette games while using cassette, simply because you have more limits placed on you by the medium - mind you, a lot of diskette-based adventure writers could learn a lot from Level 9.

I am sure that we will get lots more enjoyment from Level 9 in the future, especially if they can get over these delusions of grandeur, (and make their parser a little bit more honest!) ●

# "I keep getting ERROR 8 but I have checked the line and nothing is wrong'

## Les Ellingham offers a solution,to help beginners

The above must be one of the most common calls for help that we get from our readers. Most people look up the error to find 'DATA MIS-MATCH' or similar (see Steve Pedler's article for further information) and because the on screen message states 'Error 8 in line xxx' they assume that the line in question has been typed wrong. Not necessarily so. The error is normally linked to a READ statement in the line in question and the actual error is in the DATA that this line is trying to read. So how do you know where the error actually is?

What you need to do is check through the DATA in your program for a mis-type, maybe a full stop instead of a comma, a letter O instead of figure 0 or a comma at the end of a line. If however the program has dozens of lines of DATA as is often the case, how do you know where to look? Fear not, this little program added to the end of your listing will help you to pinpoint the error quite quickly.

```
AX 32500 ERRLINE=PEEK(183)+256*PEEK(184):
    ERRITEM=PEEK(182)
KK 32510 ? "DATA MIS-MATCH IN LINE ";ERRL
    INE;" ITEM NO ";ERRITEM+1
IJ 32520 ? :LIST ERRLINE
```

### How to use the listing:

As the listing is so short you could just type it in at the end of each program but a better way is to type it in now and save it to tape using LIST "C:" or to disk using LIST "D:ERROR.8". When you have typed in your program, add this listing by typing ENTER "C:" or ENTER "D:ERROR.8" which will then add these lines to the end of your program. (Make sure that the program does not already use the same line numbers.)

You now have two choices. RUN your program and if 'ERROR 8' comes up, type GOTO 32500 and you will find out where the error is. Alternatively you can automate the process by adding the following line to your program

0 TRAP 32500

and the program will then jump straight to the routine.

Once you have edited the line concerned, RUN the program again until you have no more errors. It is a good idea to SAVE the edited program regularly or note separately each alteration as some programs do not allow you to break and save them once they are up and running.

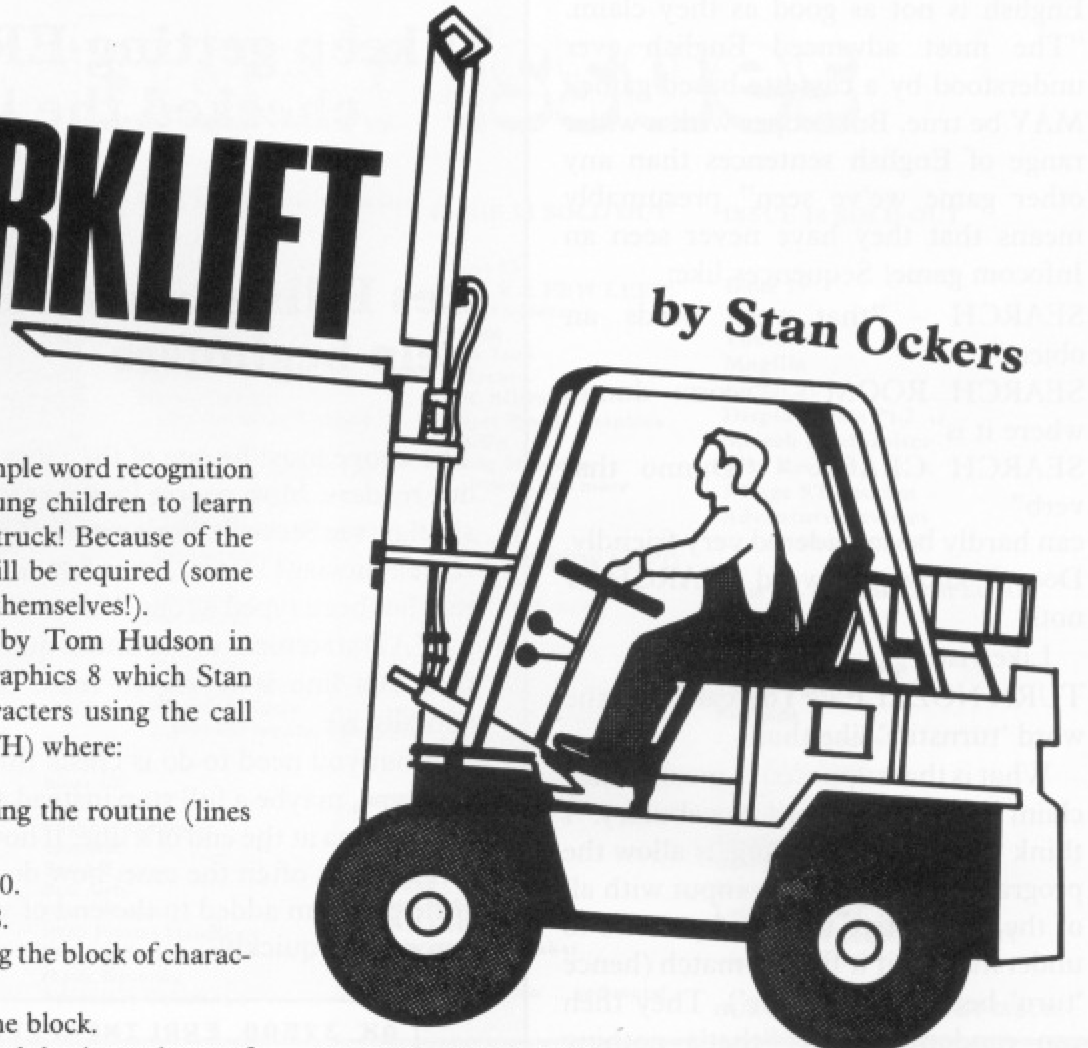
### A Final Warning.

This little routine is not infallible. Some programs read numbers into a variable followed by letters into a string and the errors come when you get out of sequence. Always check that you have enough DATA in the preceding line (usually numbers). If you have made a complete mess, such as missing out a whole line, then I am afraid you are back on your own!

Try the routine anyway, it could save you many frustrating hours.

# *Education*

# FORKLIFT



by Stan Ockers

Forklift is an excellent combination of a simple word recognition game with a logic puzzle and will allow young children to learn whilst having fun driving their own forklift truck! Because of the logic puzzle involved some parental help will be required (some parents might even find it quite a challenge themselves!).

The routine is based around an article by Tom Hudson in ANALOG magazine for printing text in Graphics 8 which Stan Ockers has modified to print blocks of characters using the call A=USR(ADDR, X, Y, BADR, SIZE, WIDTH) where:

| | |
|---|---|
| ADDR | is the address of the string holding the routine (lines 4000 - 4100). |
| X | is the X position as in Graphics 0. |
| Y | is the Y position as in graphics 8. |
| BADR | is the address of the string holding the block of characters to be printed. |
| SIZE | is the number of characters in the block. |
| WIDTH | is the number of characters in each horizontal row of the block. |

The object of the game is to take three rhyming words from the pile on the left and stack them in the pile on the right. Use a joystick in port 1.

```
HD 10 DIM PM$(1):REM *** ENTER THIS LINE
   FIRST ***
HZ 20 REM ******************************
GM 25 REM *          FORKLIFT          *
TM 30 REM *       by STAN OCKERS       *
GP 35 REM * -------------------------- *
FU 40 REM *       First published in   *
AP 45 REM *          ACE Newsletter    *
WY 50 REM *   3662, Vine Maple Drive,  *
IZ 55 REM * Eugene, Oregon 97405, USA  *
ID 60 REM ******************************
BE 70 REM
DX 100 GRAPHICS 18:POSITION 7,5:? #6;"FoR
   KLiFt":POSITION 5,8:? #6;"INITIALIZING
   ":POSITION 3,10
ZF 110 ? #6;"takes 23 seconds":GOSUB 4000
   :POKE 559,0:GOSUB 3000
SC 198 REM
PA 199 REM *** STARTING POSITIONS ***
WC 200 GOSUB 2000:TOPL=C4:YL=TOPL*C8:XL=C
   0:SIZL=14:GOSUB 920
BC 210 RP$(C1)=" ":RP$(98)=" ":RP$(C2)=RP
   $:YR=16:XR=33:SIZR=C8:GOSUB 930:YR=80:
   GOSUB 930:POKE 712,66
FT 220 TOPR=18:TOPC=18:SIZR=C0:SIZC=C0:FR
   K=96:LDED=C0:AREA=C2:DIR=RT:X=C0:OSET=
   58:BOSET=C6:ROSET=74:WOSET=89
KS 230 CKFLG=C0:FRKC$=FRKL$:BODYC$=BODYL$
   :RACKC$=RACKL$:GOSUB 900
SD 298 REM
EZ 299 REM *** MAIN LOOP ***
DI 300 STK=STICK(C0)
CP 302 SOUND C1,C0,C0,C0
QZ 310 ON AREA GOSUB 400,450,500,520,530,
   550,600
MU 390 GOTO 300
SE 398 REM
CU 399 REM *** AREA #1 - LEFT EDGE ***
AZ 400 IF STK=UP THEN GOSUB 1050
MG 410 IF (STK=DN) THEN GOSUB 1100
SP 420 IF STK=RT THEN AREA=C2:SOUND C2,60
   ,12,10:DIR=RT
ZG 430 RETURN
RV 448 REM
GK 449 REM *** AREA #2 LEFT PILE ***
QE 450 IF DIR=LT THEN GOSUB 1200
YK 460 IF DIR=RT THEN GOSUB 1250
ZO 470 RETURN
SF 498 REM
AB 499 REM *** AREA #3 CENTER ***
YT 500 IF STK=UP THEN GOSUB 1300
VN 502 IF STK=DN THEN GOSUB 1350
DO 504 IF STK=LT THEN AREA=C2:DIR=LT
PY 506 IF STK=RT THEN AREA=C4:DIR=RT
ZZ 508 RETURN
RQ 518 REM
AF 519 REM *** AREA #4 CENTER ***
SB 520 IF DIR=LT THEN GOSUB 1400
AL 522 IF DIR=RT THEN GOSUB 1450
ZR 524 RETURN
RD 529 REM *** AREA #5 RIGHT CENTER ***
YZ 530 IF STK=UP THEN GOSUB 1300
VT 532 IF STK=DN THEN GOSUB 1350
FU 534 IF STK=LT THEN AREA=C4:DIR=LT
SE 536 IF STK=RT THEN AREA=C6:DIR=RT
AF 538 RETURN
RW 548 REM
CY 549 REM *** AREA #6 RIGHT PILE ***
SK 550 IF SIZR=C6 AND CKFLG=C0 THEN GOSUB
    3500
ZH 555 IF DIR=LT THEN GOSUB 1550
WE 560 IF DIR=RT THEN GOSUB 1500
ZP 570 RETURN
SG 598 REM
GK 599 REM *** AREA #7 - RIGHT EDGE ***
HH 600 IF STK=UP THEN GOSUB 1650
UE 610 IF STK=DN THEN GOSUB 1700
HH 620 IF STK=LT THEN AREA=C6:DIR=LT
```

```
ZI 630 RETURN
SJ 898 REM
GW 899 REM *** MOVE FORKS & WORDS ***
AG 900 PM$(FRK+523)=FRKC$:POKE 53250,X*C4
   +OSET
JR 902 PM$(803)=RACKC$:POKE 53251,X*C4+RO
   SET:POKE 53249,X*C4+WOSET
HF 905 A=USR(AADR,X+BOSET,120,BADR,35,C7)
PV 910 IF LDED=C0 THEN RETURN
SQ 915 A=USR(AADR,X,Y,CADR,SIZC*C7,C7):RE
   TURN
RU 918 REM
AP 919 REM *** REPLACE LEFT PILE ***
FG 920 IF SIZL=C0 THEN RETURN
KN 925 A=USR(AADR,XL,YL,LPADR,SIZL*C7,C7)
   :RETURN
RW 928 REM
UG 929 REM *** REPLACE RIGHT PILE ***
HW 930 IF SIZR=C0 THEN RETURN
EW 940 A=USR(AADR,XR,YR,RPADR,SIZR*C7,C7)
   :RETURN
SK 998 REM
IM 999 REM *** LOAD FORK LEFT PILE ***
AX 1000 TEMP$=LP$:IF (FRK/C8<TOPL+C2) THE
   N RETURN
UQ 1005 IF SIZL=C0 THEN RETURN
BZ 1010 LDED=C1:C$(C8)=LP$:SIZC=FRK/C8-TO
   PL+C2:SIZL=18-FRK/C8:TOPC=TOPL-C1
GK 1020 P=SIZC*C7-C7:C$(P)=B$:IF SIZL>C0
   THEN LP$=TEMP$((FRK/C8-TOPL)*C7+C1)
AU 1030 TOPL=FRK/C8:YL=TOPL*C8:POKE 712,7
   0:PITCH=50:GOSUB 1800:RETURN
JO 1048 REM
TX 1049 REM *** MOVE UP LEFT SIDE ***
LF 1050 SOUND C1,120,12,C8:IF LDED=C0 THE
   N GOSUB 1000
NS 1060 IF (FRK/C8-SIZC)<=C0 THEN RETURN
YR 1070 Y=TOPC*C8:FOR J=C1 TO 16:Y=Y-C1:F
   RK=FRK-C1:GOSUB 900:GOSUB 920:IF FRK>1
   28 THEN GOSUB 1900
VO 1080 NEXT J:TOPC=TOPC-C2
BA 1090 RETURN
KD 1098 REM
YE 1099 REM *** MOVE DOWN LEFT SIDE ***
XH 1100 SOUND C1,130,12,C8:IF LDED=C0 THE
   N RETURN
ZO 1110 IF (FRK/C8=TOPL) THEN GOSUB 1150:
   RETURN
SC 1120 Y=TOPC*C8:FOR J=C1 TO 16:Y=Y+C1:F
   RK=FRK+C1:GOSUB 900:GOSUB 920:IF FRK>1
   28 THEN GOSUB 1900
DR 1130 NEXT J:TOPC=TOPC+C2:RETURN
JQ 1148 REM
TR 1149 REM *** UNLOAD LEFT SIDE ***
DP 1150 IF LDED=C0 THEN RETURN
DJ 1160 TEMP$=C$(C8):IF FRK/C8<18 THEN TE
   MP$(SIZC*C7-13)=LP$
WH 1170 LP$=TEMP$:SIZL=SIZL+SIZC-C2:TOPL=
   TOPC+C1:YL=TOPL*C8:LDED=C0:POKE 712,66
   :PITCH=150:GOSUB 1800:RETURN
KF 1198 REM
XD 1199 REM *** MOVE LEFT AREA #2 ***
FE 1200 SOUND C2,90,12,C6:IF FRK/C8>TOPL
   AND LDED=C1 THEN DIR=RT:GOSUB 1850:RET
   URN
BG 1205 IF FRK>144 THEN DIR=RT:GOSUB 1850
   :RETURN
HX 1210 IF X=C0 THEN AREA=C1:SOUND C2,C0,
   C0,C0:RETURN
ZK 1220 X=X-C1:GOSUB 900:IF FRK=144 THEN
   GOSUB 1900
HK 1230 IF LDED=C1 THEN GOSUB 920
AP 1240 RETURN
JS 1248 REM
NR 1249 REM *** MOVE RIGHT AREA #2 ***
YK 1250 SOUND C2,90,12,C6:IF X=C7 THEN AR
   EA=C3:SOUND C2,C0,C0,C0:RETURN
SJ 1260 X=X+C1:GOSUB 900
QY 1270 IF LDED=C1 THEN GOSUB 920:IF FRK=
   144 THEN GOSUB 1900
BB 1280 RETURN
KH 1298 REM
CM 1299 REM *** GO UP CENTER ***
MP 1300 SOUND C1,120,12,C8:IF (FRK/C8-SIZ
   C)<=C0 AND LDED=C1 THEN RETURN
YQ 1305 IF FRK<=32 THEN RETURN
ZJ 1310 FOR J=C1 TO 16:Y=Y-C1:FRK=FRK-C1:
   GOSUB 900:NEXT J:TOPC=TOPC-C2:RETURN
GT 1348 REM *** GO DOWN CENTER ***
AJ 1350 SOUND C1,130,12,C8:IF (FRK=160) T
   HEN RETURN
QK 1360 FOR J=C1 TO 16:Y=Y+C1:FRK=FRK+C1:
   GOSUB 900:NEXT J:TOPC=TOPC+C2:RETURN
KJ 1398 REM
XZ 1399 REM *** GO LEFT CENTER ***
WV 1400 SOUND C2,90,12,C6:IF X=C6 THEN AR
   EA=C3:SOUND C2,C0,C0,C0:RETURN
CI 1403 IF X=23 THEN BODYC$=BLNK$:GOSUB 9
   00
CS 1404 IF X=21 THEN WOSET=-40
YN 1405 IF X=17 THEN OSET=58:BOSET=C6:FRK
   C$=FRKL$:RACKC$=RACKL$:ROSET=66
MC 1406 IF X=14 THEN ROSET=74
VC 1407 IF X=10 THEN BODYC$=BODYL$:WOSET=
   89
SW 1410 X=X-C1:GOSUB 900:RETURN
JW 1448 REM
KC 1449 REM *** GO RIGHT CENTER ***
HR 1450 SOUND C2,90,12,C6:IF X>25 THEN AR
   EA=C5:SOUND C2,C0,C0,C0:RETURN
BC 1453 IF X=10 THEN BODYC$=BLNK$:GOSUB 9
   00
NB 1454 IF X=11 THEN WOSET=-44:ROSET=64
ZM 1455 IF X=15 THEN OSET=49:BOSET=-6:FRK
   C$=FRKR$:RACKC$=RACKR$
JE 1456 IF X=17 THEN ROSET=42
PK 1457 IF X=20 THEN BODYC$=BODYR$:WOSET=
   26
ST 1460 X=X+C1:GOSUB 900:RETURN
KL 1498 REM
TE 1499 REM *** MOVE RIGHT AREA #6 ***
AC 1500 SOUND C2,90,12,C6:IF FRK/C8>TOPR
   AND LDED=C1 THEN DIR=LT:GOSUB 1850:RET
   URN
IU 1505 IF FRK>144 THEN DIR=LT:RETURN
IN 1510 IF X=33 THEN AREA=C7:SOUND C2,C0,
   C0,C0:RETURN
YY 1520 X=X+C1:GOSUB 900:IF FRK=144 THEN
   GOSUB 1900
IT 1530 IF LDED=C1 THEN GOSUB 930
AV 1540 RETURN
JY 1548 REM
BM 1549 REM *** MOVE LEFT AREA #6 ***
TZ 1550 SOUND C2,90,12,C6:IF X<26 THEN AR
   EA=C5:CKFLG=C0:SOUND C2,C0,C0,C0:RETUR
   N
AC 1560 X=X-C1:GOSUB 900:IF FRK=144 THEN
   GOSUB 1900
JF 1570 IF LDED=C1 THEN GOSUB 930
BH 1580 RETURN
ZH 1599 REM *** LOAD WORDS RIGHT PILE ***
LB 1600 TEMP$=RP$:IF (FRK/C8<TOPR+C2) THE
   N RETURN
XW 1605 IF SIZR=C0 THEN RETURN
RH 1610 LDED=C1:C$(C8)=RP$:SIZC=FRK/C8-TO
   PR+C2:SIZR=18-FRK/C8:TOPC=TOPR-C1
NW 1620 P=SIZC*C7-C7:C$(P)=B$:IF SIZR>C0
   THEN RP$=TEMP$((FRK/C8-TOPR)*C7+C1)
NG 1630 TOPR=FRK/C8:YR=TOPR*C8:POKE 712,7
   0:PITCH=50:GOSUB 1800:RETURN
KA 1648 REM
QY 1649 REM *** MOVE UP RIGHT SIDE ***
WT 1650 SOUND C1,120,12,C8:IF LDED=C0 THE
   N GOSUB 1600
```
→

```
OE 1660 IF (FRK/C8-SIZC)<=C0 THEN RETURN
BR 1670 Y=TOPC*C8:FOR J=C1 TO 16:Y=Y-C1:F
    RK=FRK-C1:GOSUB 900:GOSUB 930:IF FRK>1
    28 THEN GOSUB 1900
WA 1680 NEXT J:TOPC=TOPC-C2
BM 1690 RETURN
KP 1698 REM
BP 1699 REM *** MOVE DOWN RIGHT SIDE ***
XT 1700 SOUND C1,130,12,C8:IF LDED=C0 THE
    N RETURN
MS 1710 IF (FRK/C8=TOPR) THEN GOSUB 1750:
    RETURN
VC 1720 Y=TOPC*C8:FOR J=C1 TO 16:Y=Y+C1:F
    RK=FRK+C1:GOSUB 900:GOSUB 930:IF FRK>1
    28 THEN GOSUB 1900
ED 1730 NEXT J:TOPC=TOPC+C2:RETURN
KC 1748 REM
NN 1749 REM *** UNLOAD RIGHT SIDE ***
EB 1750 IF LDED=C0 THEN RETURN
QN 1760 TEMP$=C$(C8):IF FRK/C8<18 THEN TE
    MP$(SIZC*C7-13)=RP$
NX 1770 RP$=TEMP$:SIZR=SIZR+SIZC-C2:TOPR=
    TOPC+C1:YR=TOPR*C8:LDED=C0:POKE 712,66
    :PITCH=150:GOSUB 1800:RETURN
KR 1798 REM
TL 1799 REM *** DING ***
ZY 1800 FOR J=12 TO C1 STEP -C1:SOUND C0,
    PITCH,10,J:NEXT J:SOUND C0,C0,C0,C0:RE
    TURN
KE 1848 REM
BJ 1849 REM *** CRASH ***
UL 1850 FOR J=15 TO C1 STEP -C1:SOUND C1,
    200,C8,J:NEXT J:SOUND C1,C0,C0,C0:RETU
    RN
KT 1898 REM
JN 1899 REM *** PRINT THE DOCKS ***
HF 1900 A=USR(AADR,C0,145,DADR,12,C6):A=U
    SR(AADR,34,145,DADR,12,C6):RETURN
KV 1998 REM
AI 1999 REM *** SET UP WORDS ***
JW 2000 LP$=" ______   █████  ":LP$(98)=" ":
    LP$(15)=LP$:RESTORE 2100:PICK=INT(RND(
    C0)*C9)+C1
WK 2010 FOR J=C1 TO PICK:READ MTCH$:NEXT
    J:CNT=C0:FOR J=C3 TO 87 STEP 14
SO 2020 LINE=INT(RND(C0)*C9)+C1
JU 2021 IF RND(C0)<0.33 THEN LINE=PICK
XP 2022 RESTORE 2100+10*LINE:K=INT(RND(C0
    )*C5)+C1:FOR L=C1 TO K:READ WD$:NEXT L
JS 2024 FOR Q=C3 TO J STEP 14:IF WD$=LP$(
    Q,Q+C2) THEN 2020
JE 2026 NEXT Q
KD 2030 IF LINE=PICK THEN CNT=CNT+C1:IF C
    NT>C3 THEN 2020
CF 2040 IF J=31 AND CNT=C0 THEN 2020
HY 2042 IF J=59 AND CNT=C1 THEN 2020
JM 2044 IF J=87 AND CNT=C2 THEN 2020
UN 2060 LP$(J,J+C2)=WD$:NEXT J
YR 2070 ? CHR$(125):POKE 656,C0:POKE 657,
    22:? "get 3 _";MTCH$;" words":POKE 559
    ,62
BB 2090 RETURN
FP 2100 DATA AN,ED,AT,OT,UN,AD,AG,ID,AP
DL 2110 DATA CAN,PAN,RAN,FAN,MAN
OZ 2120 DATA BED,FED,LED,RED,WED
ZX 2130 DATA BAT,CAT,SAT,FAT,RAT
NO 2140 DATA HOT,POT,NOT,LOT,ROT
FH 2150 DATA BUN,GUN,FUN,RUN,SUN
IM 2160 DATA MAD,SAD,LAD,BAD,HAD
QH 2170 DATA BAG,SAG,TAG,RAG,NAG
OA 2180 DATA BID,LID,HID,DID,RID
FL 2190 DATA CAP,LAP,SAP,NAP,ZAP
KW 2998 REM
DT 2999 REM *** INITIALIZE ***
MN 3000 C0=0:C1=1:C2=2:C3=3:C4=4:C5=5:C6=
    6:C7=7:C8=8:C9=9
UY 3010 DIM LP$(98),RP$(98),C$(112),TEMP$
    (98),W$(C7),B$(C7),F$(C9)
IP 3020 LPADR=ADR(LP$):RPADR=ADR(RP$):CAD
    R=ADR(C$):TADR=ADR(TEMP$):FADR=ADR(F$)
    :C$(1)=" ":C$(112)=" ":C$(2)=C$:B$=C$
YW 3030 UP=14:DN=13:LT=11:RT=C7
XD 3050 GRAPHICS C8:POKE 559,C0:PM=PEEK(1
    06)-40:POKE 54279,PM:POKE 53258,C1:POK
    E 706,166:POKE 53277,C3
DX 3060 VVTP=PEEK(134)+PEEK(135)*256:STAR
    P=ADR(PM$):OFFS=PM*256+1024-STARP:HI=I
    NT(OFFS/256):LO=OFFS-HI*256
YT 3070 POKE VVTP+C2,LO:POKE VVTP+C3,HI:P
    OKE VVTP+C5,C4:POKE VVTP+C6,C0:POKE VV
    TP+C7,C4
MN 3075 PM$(C1)=CHR$(C0):PM$(1024)=CHR$(C
    0):PM$(C2)=PM$
NN 3080 DIM FRKL$(20),FRKR$(20),FRKC$(20)
    :FOR J=C2 TO 16:FRKL$(J)=CHR$(C1):FRKR
    $(J)=CHR$(128):NEXT J
MZ 3090 FOR J=17 TO 19:FRKL$(J)=CHR$(255)
    :FRKR$(J)=CHR$(255):NEXT J:FRKL$(20)=C
    HR$(C0):FRKR$(20)=CHR$(C0)
ED 3100 POKE 710,32:POKE 623,C1:DIM MTCH$
    (C2),WD$(C3)
HC 3110 DIM BODYL$(35),BLNK$(35):BODYL$="
      ▌  ▀▀▄▌  ▐●●▌  ████  ▼  "
UU 3120 DIM BODYR$(35),BODYC$(35):BODYR$=
    "  ▌  ▌▄▀▀  ▐●●▌  ████  ▼  ":
    BADR=ADR(BODYC$)
MR 3130 BLNK$(C1)=" ":BLNK$(35)=" ":BLNK$
    (C2)=BLNK$:FOR J=34 TO 194:PM$(J,J)=CH
    R$(255):NEXT J
BQ 3140 POKE (704),42:POKE 53248,110:POKE
     53256,C3
PD 3150 DIM RACKL$(160),RACKR$(160),RACKC
    $(160):RACKL$(C1)=CHR$(192):RACKL$(C2)
    =CHR$(64):RACKL$(150)=" "
OO 3160 RACKL$(C3)=RACKL$:RACKR$(C1)=CHR$
    (C3):RACKR$(C2)=CHR$(C2):RACKR$(150)="
     ":RACKR$(C3)=RACKR$
ZH 3170 RESTORE 3180:FOR J=150 TO 160:REA
    D A:RACKL$(J,J)=CHR$(A):NEXT J
LT 3172 RESTORE 3182:FOR J=150 TO 160:REA
    D A:RACKR$(J,J)=CHR$(A):NEXT J
CI 3180 DATA 8,28,62,54,99,99,99,54,62,28
    ,8
KI 3182 DATA 16,56,124,108,198,198,198,10
    8,124,56,16
GD 3190 POKE 707,C4
GF 3200 RESTORE 3210:FOR J=444 TO 450:REA
    D A:PM$(J,J)=CHR$(A):NEXT J:POKE 705,C
    4
NW 3210 DATA 8,28,62,62,62,28,8
GW 3220 DIM DOCK$(12):DOCK$="██████||||||
    ":DADR=ADR(DOCK$):GOSUB 1900
ZA 3230 A=PEEK(560)+256*PEEK(561)
JE 3240 IF PEEK(A)<>66 THEN A=A+C1:GOTO 3
    240
WR 3250 POKE A,70:POKE A+C3,C6:POKE A+C4,
    C6:POKE A+C5,C6
AH 3300 RETURN
KN 3498 REM
ZV 3499 REM *** CHECK FOR DONE ***
RS 3500 CNT=C0:CKFLG=C1:PITCH=40
TJ 3510 IF RP$(C4,C5)=MTCH$ AND RP$(18,19
    )=MTCH$ AND RP$(32,33)=MTCH$ THEN 3550
AR 3520 RETURN
DU 3550 FOR K=C0 TO C9:POKE 656,C0:POKE 6
    57,22:? "     great job!!!    ":PITCH=100
    -C5*K:GOSUB 1800
FF 3560 POKE 656,C0:POKE 657,22:? "
                ":FOR L=C0 TO 10:NEXT L:NE
    XT K
GT 3580 POKE 559,C0:BODYC$=BLNK$:A=USR(AA
    DR,X+BOSET,120,BADR,35,C7):PM$(FRK+523
    ,FRK+542)=PM$(FRK+443,FRK+562)
YU 3590 POP :GOTO 200
```

*continued on page 65*

# READERS POLL RESULTS

Thank you to everyone who took the trouble to vote in the Readers Poll from issue 19. Due to the astonishing number of cards returned it has taken quite a few hours of work to come up with the results but here they are at last, in fact a complete Top Ten of the various articles and contributions from issues 13 to 18.

Interestingly, the pattern is very similar to previous years with every single contribution receiving at least one vote and with David Blease and Mark Hutchinson up in the top three yet again. Anyway, to save further suspense, here are the Top Ten contributions to PAGE 6 issues 13 to 18 as voted for by our readers.

1. **FIRST STEPS by Mark Hutchinson**
2. **TYPO 3 by Alec Benson**
3. **CASTLE MORGUE by David Blease**
4. **Grand Prix II by Chris Darkes**
5. **Display Lists Pt.1 by Steve Pedler**
6. **Atari Book of Books by Kevin Fleming**
7. **Software Reviews by Jim Short and others.**
8. **Adventure Column by Garry Francis**
9. **The Booster by Phil Davies**
10. **130XE Review by Les Ellingham**

First Steps was a clear winner all the way with most votes going for the A-Z of BASIC which obviously helped a lot of new owners and TYPO 3 just had to be up there for the untold number of hours it must have salvaged from debugging sessions. There were also quite a few surprises (at least to me!) especially the review of the 130XE reaching the Top Ten. Equally surprising was the fact that just five points outside the Ten was De Re Piracy which surely goes to prove that most owners *do* care about the future of Atari and it is only the minority that have caused all the problems in the past. Equally surprising was that many of the the articles or programs included as 'minority interest' received a fair number of votes.

Anyway, on with this year. With the knowledge of what you found most interesting last year we can hopefully produce more good balanced issues. The top three authors in the poll have received various goodies of their choice plus worldwide fame and recognition! Why don't you see if you can get into that Top Ten next time?

*The winners of the draw associated with the Survey and Poll have all received their prizes. Winner of the 1050 Disk Drive was D.G.Reed from Oxfordshire and the following people each received a Ballblazer cassette. A.G. Seagrave of Croydon, D.Rowlands of Lincoln, David Cheung from London, Mark Hemstock from Heanor, J. Bowles from Brighton, Andrew Kemp from London, F. Maltby of Mobberley and Harry Clark from Barking in Essex. Congratulations to the winners and many thanks to all those who sent in cards.*

FIRST STEPS

# WRITE A GAME

## concluded

Due to the fact that the Editor needs this article right away (no rest for the wicked!), I have had no response as yet about issue 20. This issue finishes the game, at least my part of it, and any response will be published in the next edition.

In this issue I have included the full listing that we have been working on. Study it carefully, and beware of the NEW in line 3030 - SAVE your listing first! I have made changes in the listing for this edition to include a 'WIN' screen. Notice in line 5010 the W$. This is used to store the name of the player currently playing. The winner will be the last person to choose a position on the board and his name will be stored in W$.

Line 3100 counts the number of choices and when the maximum of 9 appears without a win taking place, the game is drawn. I had originally used a variable (C) here to check when the computer recognises the game is drawn. For instance, if C=8 at the start of the test will the computer recognise a drawn game after the next choice? Or will C have to equal 9 at the end of the last choice? I picked the latter method and, as usual, forgot to delete C. Well spotted Cliff.

In line 130 I did not need to test 'IF CO=1'. IF CO on its own means 'if CO does not equal zero'. Similarly, line 140 uses 'IF NOT CO' to test if CO equals zero. Notice in line 110 that I did not need to use 'THEN GOTO 4000' only 'GOTO 4000'. If you look at line 4020 you will notice control characters to position the text. I could have used POKE or POSITION just as easily, but this would use lots more memory.

The subroutine at line 3000 checks the eight possible ways of having a winning line, i.e. three vertical, three horizontal and two diagonal. Again I have used LOCATE and compared the figures stored in the squares.

You may also note that, for a change, I have used the OPEN and GET statements to look directly at the keyboard. You could always have used this during the choice of squares, however, if you had made a mistake or wanted to change your mind there is no way to do this as the program just runs on. Unless of course you include an "Are you sure" prompt.

As I mentioned in the last issue, I am not going to write a subroutine for the computer, but have included a few REM's to give a small hint on how to tackle it. All the details are available over the past few issues, or you could write your own subroutine.

I have been fiddling about with this game during the writing of this column and some mistakes had crept in. I have spotted most of them, but you might find some I missed. It is near impossible to find all of your mistakes. This is why it is a good idea to lend out a few copies to friends. They will see the game through fresh eyes and hopefully spot any errors.

As you can see from the listing, the game is wholly in Basic and uses lots of variable comparisons, yet, when played, the

```
EI 1 REM *********************************
UD 2 REM *  FIRST STEPS - WRITE A GAME *
PO 3 REM *    The final listing for    *
MW 4 REM * users to improve or extend  *
EC 5 REM * --------------------------- *
DJ 6 REM *    by MARK HUTCHINSON for   *
JA 7 REM *  PAGE 6 MAGAZINE - ENGLAND  *
EP 8 REM *********************************
NS 9 REM *** Set up intro screen.
OD 10 GOSUB 5010
UT 98 REM *** Main sequence.
GE 99 REM *** Player #1 to choose.
US 100 W$=A$:GOSUB 1000:IF WRONG THEN 100
GS 109 REM *** Test for winner.
MD 110 GOSUB 3000:IF WIN=1 THEN 4000
DL 120 FOR T=1 TO 200:NEXT T
DU 129 REM *** Computer or player #2 to
                choose.
UV 130 IF CO THEN W$="COMPUTER":GOSUB CMP
   TR:IF WRONG THEN 130
AX 140 IF  NOT CO THEN W$=B$:GOSUB 2000:I
   F WRONG THEN 120
HA 149 REM *** Test for winner.
ML 150 GOSUB 3000:IF WIN=1 THEN 4000
LS 160 GOTO 100
YJ 999 REM *** Get player #1's choice.
FK 1000 WRONG=0:POKE 764,255:? "KYour cho
   ice ";A$:REM *** Clear 'last key press
   ed' register
OB 1009 REM *** Place X in square.
NI 1010 K=PEEK(764):IF K=255 THEN 1010:RE
   M *** Keep looking.
EU 1020 IF K=63 THEN LOCATE 8,3,N:IF N<>2
   16 THEN IF N<>239 THEN POSITION 8,3:?
   #6;X$:RETURN
LC 1030 IF K=21 THEN LOCATE 10,3,N:IF N<>
   216 THEN IF N<>239 THEN POSITION 10,3:
   ? #6;X$:RETURN
VS 1040 IF K=18 THEN LOCATE 12,3,N:IF N<>
   216 THEN IF N<>239 THEN POSITION 12,3:
   ? #6;X$:RETURN
OU 1050 IF K=58 THEN LOCATE 8,5,N:IF N<>2
   16 THEN IF N<>239 THEN POSITION 8,5:?
   #6;X$:RETURN
UT 1060 IF K=42 THEN LOCATE 10,5,N:IF N<>
   216 THEN IF N<>239 THEN POSITION 10,5:
   ? #6;X$:RETURN
EV 1070 IF K=56 THEN LOCATE 12,5,N:IF N<>
   216 THEN IF N<>239 THEN POSITION 12,5:
   ? #6;X$:RETURN
UC 1080 IF K=61 THEN LOCATE 8,7,N:IF N<>2
   16 THEN IF N<>239 THEN POSITION 8,7:?
   #6;X$:RETURN
FV 1090 IF K=57 THEN LOCATE 10,7,N:IF N<>
   216 THEN IF N<>239 THEN POSITION 10,7:
   ? #6;X$:RETURN
```

game is not noticeably slow for all this. Because I wrote the program originally as an example of how to write a simple game and not as an example of advanced programming, the graphics are not very good. But then again this leaves room for your imagination to work!

The strange thing about 'Write a Game' has been the shortage of mail I have received since it started. Now that it is over I will need some suggestions from readers about future topics. You know the address so why not write? If you don't know the address it's : **Mark Hutchinson, BAUG Software, P.O.BOX 123, BELFAST, BT10 0DB**

**by Mark Hutchinson**

```
JA 1100 IF K=13 THEN LOCATE 12,7,N:IF N<>
    216 THEN IF N<>239 THEN POSITION 12,7:
    ? #6;X$:RETURN
QJ 1110 ? "KCHOICE MUST BE A-I ONLY":FOR
    V=15 TO 0 STEP -0.1:SOUND 0,150,14,V:N
    EXT V:SOUND 0,0,0,0:WRONG=1:RETURN
VT 1999 REM *** Get player #2's choice.
XK 2000 WRONG=0:POKE 764,255:? "KYour cho
    ice ";B$:REM *** Clear register.
HE 2009 REM *** Place O in square.
OP 2010 K=PEEK(764):IF K=255 THEN 2010:RE
    M *** Keep looking.
DD 2020 IF K=63 THEN LOCATE 8,3,N:IF N<>2
    16 THEN IF N<>239 THEN POSITION 8,3:?
    #6;O$:RETURN
IT 2030 IF K=21 THEN LOCATE 10,3,N:IF N<>
    216 THEN IF N<>239 THEN POSITION 10,3:
    ? #6;O$:RETURN
TJ 2040 IF K=18 THEN LOCATE 12,3,N:IF N<>
    216 THEN IF N<>239 THEN POSITION 12,3:
    ? #6;O$:RETURN
ND 2050 IF K=58 THEN LOCATE 8,5,N:IF N<>2
    16 THEN IF N<>239 THEN POSITION 8,5:?
    #6;O$:RETURN
SK 2060 IF K=42 THEN LOCATE 10,5,N:IF N<>
    216 THEN IF N<>239 THEN POSITION 10,5:
    ? #6;O$:RETURN
CM 2070 IF K=56 THEN LOCATE 12,5,N:IF N<>
    216 THEN IF N<>239 THEN POSITION 12,5:
    ? #6;O$:RETURN
SL 2080 IF K=61 THEN LOCATE 8,7,N:IF N<>2
    16 THEN IF N<>239 THEN POSITION 8,7:?
    #6;O$:RETURN
DM 2090 IF K=57 THEN LOCATE 10,7,N:IF N<>
    216 THEN IF N<>239 THEN POSITION 10,7:
    ? #6;O$:RETURN
GR 2100 IF K=13 THEN LOCATE 12,7,N:IF N<>
    216 THEN IF N<>239 THEN POSITION 12,7:
    ? #6;O$:RETURN
KW 2110 ? "KCHOICE MUST BE A-I ONLY":FOR
    V=15 TO 0 STEP -0.1:SOUND 0,150,12,V:N
    EXT V:SOUND 0,0,0,0:WRONG=1:RETURN
IS 2999 REM *** Test for win.
JR 3000 WIN=0:LOCATE 8,3,A:LOCATE 8,5,D:L
    OCATE 8,7,G:IF A=D AND A=G THEN WIN=1
SN 3010 LOCATE 10,3,B:LOCATE 10,5,E:LOCAT
    E 10,7,H:IF B=E AND B=H THEN WIN=1
LK 3020 LOCATE 12,3,C:LOCATE 12,5,F:LOCAT
    E 12,7,I:IF C=F AND C=I THEN WIN=1
DL 3030 LOCATE 8,3,A:LOCATE 10,3,B:LOCATE
     12,3,C:IF A=B AND A=C THEN WIN=1
UJ 3040 LOCATE 8,5,D:LOCATE 10,5,E:LOCATE
     12,5,F:IF D=E AND D=F THEN WIN=1
LH 3050 LOCATE 8,7,G:LOCATE 10,7,H:LOCATE
     12,7,I:IF G=H AND G=I THEN WIN=1
UL 3060 LOCATE 8,3,A:LOCATE 10,5,E:LOCATE
     12,7,I:IF A=E AND A=I THEN WIN=1
RU 3070 LOCATE 8,7,C:LOCATE 10,5,E:LOCATE
     12,3,G:IF C=E AND C=G THEN WIN=1
UF 3099 REM *** Test for drawn game.
JX 3100 COUNT=COUNT+1:IF COUNT=9 THEN 600
    0
AL 3500 RETURN
PZ 3999 REM *** Found a winner!
YF 4000 GRAPHICS 2:FOR P=0 TO 255 STEP 3:
    POKE 712,P:NEXT P:POKE 712,32
NZ 4010 ? #6;"THE WINNER OF THIS  GAME WA
    S ";W$
DV 4020 ? "K▸This game is OVER.▸▸▸▸Do you
     wish another (Y/N)"
VA 4030 OPEN #1,4,0,"K:":GET #1,G:CLOSE #
    1:IF G=89 THEN RUN
RU 4040 IF G=78 THEN ? "KTHAT'S ALL FOLKS
    ":NEW
PN 4050 GOTO 4020
MX 5009 REM *** Set up intro screen.
UJ 5010 GRAPHICS 1:POKE 559,0:POKE 710,0:
    DIM A$(12),B$(12),W$(12),X$(1),O$(1):C
    MPTR=10000:CO=0:COUNT=0:X$="X":O$="O"
LI 5015 POKE 752,1:FOR A=1 TO 100:? #6;"o
    XoX";:NEXT A:POKE 559,34
KB 5019 REM *** Set up players.
NR 5020 ? "K▸▸▸▸▸▸▸FIRST PLAYER IS X"
DY 5025 TRAP 20:? "What is your name";:IN
    PUT A$:? "Your opponent's name (* for
    computer)":INPUT B$:? "K"
OO 5030 IF B$(1,1)="*" THEN TRAP 40000:CO
    =1
WD 5039 REM *** Set up main play screen.
GB 5040 GRAPHICS 2:POKE 559,0:POKE 712,40
    :SETCOLOR 3,4,10:POKE 756,226:POKE 752
    ,1
PO 5045 POSITION 7,2:? #6;"┌─┬─┬─┐":POSIT
    ION 7,4:? #6;"├─┼─┼─┤":POSITION 7,6:?
    #6;"├─┼─┼─┤":POSITION 7,8:? #6;"└─┴─┴─
    ┘"
AJ 5050 FOR Y=3 TO 7 STEP 2:FOR X=7 TO 13
     STEP 2:POSITION X,Y:? #6;CHR$(124);:C
    =C+1:NEXT X:NEXT Y:C=97
DL 5060 FOR Y=3 TO 7 STEP 2:FOR X=8 TO 13
     STEP 2:POSITION X,Y:? #6;CHR$(C);:C=C
    +1:NEXT X:NEXT Y:POKE 559,34:RETURN
FR 5999 REM *** Try another?
DI 6000 ? "K▸This game is drawn▸▸▸▸Do you
     wish another (Y/N)"
UW 6010 OPEN #1,4,0,"K:":GET #1,G:CLOSE #
    1:IF G=89 THEN RUN
RQ 6020 IF G=78 THEN ? "KTHAT'S ALL FOLKS
    ":NEW
PF 6030 GOTO 6000
NT 10000 REM *** Insert computer regulat-
             ions here. Delete REM!
BQ 10001 REM *** Randomise X 1-9. ON X GO
    TO 10001+X to get K. Test K for a prev
    ious choice.GOSUB 2000+10*X
MV 10002 REM *** GOTO 100
```

□

# SCALEMASTER

by Peter Wright

SCALEMASTER is a straightforward number crunching program of interest to model makers, model engineers etc., indeed anyone who is interested in models or plans and their related scales. It has many functions which can be selected from the main menu. It will convert imperial measurements, (feet/inches) to metric (cm. or mm.), and back again.

If you know the full size of something you wish to model, enter it, and enter the scale that you wish to use. The program will give you the scale size of that measurement. This option has been particularly enlightening with die-cast cars such as Dinky, Corgi etc., which purport to be 1:43 scale. SCALEMASTER will tell you differently. You can also scale a model up to full size. If you have an accurate model of something such as a construction kit of an aeroplane or ship, measure it and enter the size in mm. Now tell SCALEMASTER what scale the model has been made to, (this is usually printed on the box) and SCALEMASTER will respond with the full size in feet/inches. If, on the other hand, you want to know what scale your model has been built to, enter the full size in feet/inches and enter the model size in mm. SCALEMASTER will respond with the exact scale. Finally, if you want to know how many mm. to the foot a scale represents, just enter the scale and SCALEMASTER will tell you.

Written in BASIC, SCALEMASTER uses a simple no frills GR.0 display. The program is fully error trapped with the usual exception of RUBBISH IN, RUBBISH OUT. The BREAK key has been disabled, and the program will accept responses in upper or lower case. In normal use, only the RESET key will stop it!

The idea for the program came from a friend of mine who collects model die-cast cars and wanted to check the accuracy of their scale. It has proved very successful in this respect, but I feel that the scope of the program could be widened for other model enthusiasts.

```
EI 1 REM ********************************
JR 2 REM *        SCALEMASTER          *
LR 3 REM *            by               *
ZD 4 REM *       PETER WRIGHT          *
EC 5 REM * --------------------------- *
IZ 6 REM *  PAGE 6 MAGAZINE - ENGLAND  *
EO 7 REM ********************************
NN 8 REM
FQ 20 GRAPHICS 0:POKE 752,1:SETCOLOR 2,13
   ,1:SETCOLOR 4,13,1:SETCOLOR 1,13,8:GOS
   UB 20000
AI 30 ? :? :? "↖               SCALEMASTER "
   :? :? "                 M E N U "
RY 40 ? :? :? "   1. IMPERIAL TO METRIC C
   ONVERSION":? :? "   2. METRIC TO IMPER
   IAL CONVERSION"
BW 50 ? :? "   3. SCALE DOWN FROM FULL SI
   ZE":? :? "   4. SCALE UP FROM SCALE SI
   ZE"
WV 60 ? :? "   5. SCALE FINDER":? :? "
   6. SCALE-MASTER":? :?
XS 70 ? "     PLEASE SELECT ONE OF THE ABO
   VE "
AG 80 OPEN #1,4,0,"K:":GET #1,S:CLOSE #1
OZ 90 IF S<49 OR S>54 THEN ? "↖":RUN
II 100 ON S-48 GOTO 200,300,400,500,600,7
   00
UO 199 GOSUB 1050
IF 200 ? "↖ IMPERIAL TO METRIC CONVERTION
    ":? "          accurate to 1 mm ":? :?
XH 205 TRAP 199:? "Please enter length in
    feet/inches ":? :? "    FEET=";:INPUT
   FT:? "   INCHES=";:INPUT IN:GOSUB 1000
ZA 206 ? "↑↑                 ↓↓↓↓↓↓↓↓↓↓↓↓↓↓
                "
YT 210 IF FT>=1 THEN ? :? :? FT;"ft ";IN;
   "in  =  ";MET/10;"cm":GOTO 220
XU 215 ? :? :? IMPINCH;"in  =  ";MET/10;"
   cm"
PG 220 ? :? :? :? "Any more conversions (
   Y/N)";:INPUT REP$
HH 225 IF REP$(1,1)="Y" OR REP$(1,1)="y"
   THEN 200
QD 230 GOTO 30
UP 299 GOSUB 1050
UX 300 ? "↖ METRIC TO IMPERIAL CONVERTIO
   N ":? "accurate to 1/100th of an inch
   . ":? :?
RC 305 TRAP 299:? "Please enter length in
    centimetres":? :? "  CENTIMETRES=";:I
   NPUT CENT:GOSUB 1010
MK 306 ? "↑                        "
HI 310 IF FT>=1 THEN ? :? :? CENT;"cm  =
    ";FT;"ft ";IN;"in":GOTO 320
DT 315 ? :? :? CENT;"cm  =  ";IN;"in"
GB 320 ? :? :? "Any more convertions (Y/N
   )";:INPUT REP$
JC 335 IF REP$(1,1)="Y" OR REP$(1,1)="y"
   THEN 300
QG 340 GOTO 30
UQ 399 GOSUB 1050
RV 400 ? :? "↖ SCALE DOWN FROM FULL SIZE
   ":TRAP 399
RE 405 ? :? "Please enter full size in fe
   et/inches"
UJ 410 ? :? "   FEET=";:INPUT FT:? "   IN
   CHES=";:INPUT IN:GOSUB 1000
LH 411 ? "↑↑                ↓↓↓↓↓↓↓↓↓↓↓↓↓↓
               "
WV 415 ? :? "Please enter scale you requi
   re":? "SCALE=1:";:INPUT SCALE:TRAP 399
   :? "↑                              "
ZK 420 SC=INT(10*(MMFT/SCALE))/10:SCSIZE=
   SC*FT+(10*INT((SC/12)*IN+0.5)/10)
DU 430 IF SCSIZE>=100 THEN ? :? :? "1:";S
   CALE;" scale at ";FT;"ft ";IN;"in  =
   ";SCSIZE;"mm":GOTO 440
VT 435 ? :? :? "1:";SCALE;" scale at ";FT
   ;"ft ";IN;"in  =  ";SCSIZE;"mm"
TI 440 ? :? :? "More dimensions to scale
   down (Y/N)";:INPUT REP$
KK 450 IF REP$(1,1)="Y" OR REP$(1,1)="y"
   THEN 400
QL 460 GOTO 30
UR 499 GOSUB 1050
HV 500 ? :? "↖ SCALE UP TO FULL SIZE ":T
   RAP 499
SE 505 ? :? :? "Please enter model size i
   n millimetres";:? :? "MILLIMETRES=";:I
   NPUT MM:? "↑                    "
CF 510 ? :? :? "Please enter scale of mod
```

```
   el":? "SCALE=1:";:INPUT SCALE:? "↑
                              "
ME 515 NMF=INT(MMFT/SCALE):GOSUB 550
OY 516 FT=INT(MM/NMF):INCH=MM-(FT*NMF):IN
   =INT(10*(INCH/NMF)*12)/10
MV 520 ? :? "     Model size...";MM;"mm":?
    :? "     Scale........1:";SCALE:? :? "
      Full size....";FT;"ft ";
PQ 521 ? IN;"in."
GR 525 ? :? :? :? "More dimensions to sca
   le up (Y/N)";:INPUT REP$
LZ 530 IF REP$(1,1)="Y" OR REP$(1,1)="y"
   THEN 500
QV 535 GOTO 30
IA 550 IF SCALE=24 THEN NMF=12.7:FL=1:SCA
   LE$="half an inch":RETURN
NQ 552 IF SCALE=32 THEN NMF=9.5:FL=1:SCAL
   E$="three eights of an inch":RETURN
TJ 554 IF SCALE=48 THEN NMF=6.35:FL=1:SCA
   LE$="quarter of an inch":RETURN
OS 556 IF SCALE=12 THEN NMF=25.4:FL=1:SCA
   LE$="one inch":RETURN
JV 558 IF SCALE=16 THEN NMF=19.05:FL=1:SC
   ALE$="three quarters of an inch":RETUR
   N
ZQ 560 IF SCALE=96 THEN NMF=3.175:FL=1:SC
   ALE$="one eighth of an inch":RETURN
RB 562 IF SCALE=8 THEN NMF=38.1:FL=1:SCAL
   E$="one and a half inches":RETURN
ZT 590 RETURN
US 599 GOSUB 1050
YC 600 ? :? "K    SCALE FINDER    "
CX 605 ? :? :? "Please enter full size in
    feet/inches";:TRAP 599
GV 610 ? "    FEET=";:INPUT FT:? "    INCH
   ES=";:INPUT IN:GOSUB 1000
OL 611 ? "↑↑             ↓←←←←←←←←←←←←←
            "
RQ 615 ? :? "Enter size of model in milli
   metres":? "MILLIMETERS=";:INPUT MM:? "
   ↑                        "
FC 620 SCALE=INT(10*(MET/MM)+0.5)/10
YT 625 ? :? :? "     Full size.....";FT;"f
   t ";IN;"in":? :? "     Model size....";
   MM;"mm"
SG 630 ? :? "     Scale.........1:";SCALE
QQ 635 ? :? :? "Any more scales to find (
   Y/N)";:INPUT REP$
NU 640 IF REP$(1,1)="Y" OR REP$(1,1)="y"
   THEN 600
QY 645 GOTO 30
UT 699 GOSUB 1050
XG 700 ? "K SCALE-MASTER ":FL=0
AG 705 TRAP 699:? :? :? "Enter scale you
   wish to find - 1:";:INPUT SCALE:? :? :
   ? :GOSUB 550:SC=SCALE:IF FL=1 THEN 715
XI 710 SCALE=MMFT/SC:SCALE=INT((SCALE*10)
   +0.5)/10:GOTO 720
LO 715 ? "1:";SCALE;"=";SCALE$;" to 1ft."
   :FL=0:GOTO 725
CB 720 ? "1:";SC;" = ";SCALE;"mm to 1ft."
HW 725 ? :? :? "Any more scales (Y/N)";:I
   NPUT REP$
DK 730 IF REP$="Y" OR REP$="y" THEN 700
QX 735 GOTO 30
UO 999 REM IMP TO MET CON
PD 1000 IMPINCH=(FT*12)+IN:MET=INT((IMPIN
   CH*CONIM)+0.5):RETURN :REM *ANS HERE I
   N MM
DX 1010 MIL=CENT*10:INCH=INT(100*(MIL/CON
   IM))/100:FT=INT(INCH/12):IN=INCH-(FT*1
   2):RETURN :REM *ANS HERE IN FT/IN
YP 1050 ? "K":POSITION 3,7:? "┌──────────
   ──────────────────────┐":POSITION 3,8:?
    "| INPUT ERROR!-PLEASE TRY AGAIN |"
SX 1060 POSITION 3,9:? "└──────────────
   ─────────────────┘":FOR I=1 TO 75:NEXT
   I:? "":FOR I=1 TO 75:NEXT I:? ""
US 1070 TRAP 40000:RETURN
PK 19999 END :REM *SETUP VARIABLES*
JP 20000 DIM REP$(3),SCALE$(40):CONIM=25.
   4:CONIC=2.54:MMFT=304.8:I=PEEK(16):IF
   I>127 THEN I=I-128:POKE 16,I
VZ 20010 POKE 53774,I:RETURN
```

□

# Measuring Temperature with an Atari

by P. Bartram

This article shows how to use any model of Atari computer to measure temperature, using only one component, some wire and a connector.

To use a computer to measure values in the real world we need a way of converting analogue values, such as temperature, light, or resistance into digital or on/off signals which the computer's chips can deal with. Luckily Atari computers have several analogue to digital converters built in to handle the paddle controllers, two per joystick port. Paddles, which are simply variable resistors, are not the only devices that can be plugged in however, the resistance of any device can be measured and usable values are 1k ohm to 500k ohms.

## IT COULDN'T BE EASIER!

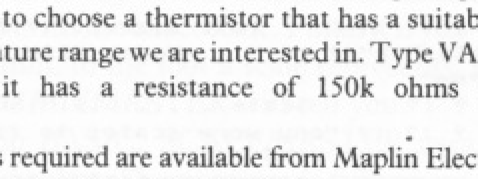
Thermistors are readily available devices whose resistance varies with temperature. All that is needed is to wire up a thermistor to two pins of a suitable connector, plug it into a joystick port and with a few lines of BASIC your Atari will be measuring temperature.

We need to choose a thermistor that has a suitable resistance in the temperature range we are interested in. Type VA 1067S is a good choice as it has a resistance of 150k ohms at 25 degrees centigrade.

The parts required are available from Maplin Electronic Supplies, P.O. Box 3, Rayleigh, Essex SS6 2BR.

Thermistor VA 1067S Order code FX43W 78 pence
D-Range 9 way socket Order code RK61R 95 pence

## MAKING THE RIGHT CONNECTIONS




Joystick port

1. Joystick switch - forward
2. Joystick switch - back
3. Joystick switch - left / Paddle A trigger
4. Joystick switch - right/ Paddle B trigger
5. Paddle B
6. Joystick trigger
7. +5V
8. 0V
9. Paddle A

The thermistor should be connected by suitable lengths of wire to pins 7 and 9 of the connector. These will be numbered on the socket but you need excellent eyesight or a magnifying glass to see them. The value will be read from BASIC from PADDLE(0) when plugged into joystick port 1 or PADDLE(2) in port 2. These values will vary from 1, at minimum resistance, to a maximum of 228.

A second thermistor could be connected to pins 5 and 7 and read as PADDLE(1) or PADDLE(3). In fact an Atari 400 or 800 could have up to eight analogue inputs and Atari 600XL, 800XL and 1200XL models up to four.

## A DEGREE OF SUCCESS

So far so good, that's the hardware done, now for the software. Our computerised thermometer must be calibrated. Plug it into controller port 2 (then you won't need to unplug your joystick), and enter and run the following one line program:

```
10 PRINT PADDLE(2):GOTO 10
```

```
US 1000 REM ######################################
HW 1005 REM Program measures temperature
US 1010 REM using thermistor wired to
UM 1015 REM PADDLE(2) contacts.
OA 1020 REM ----------------------------
KS 1025 REM PAGE 6 MAGAZINE - ENGLAND
VB 1030 REM ######################################
ZK 1040 POKE 82,0:REM Set left margin
BI 1050 GRAPHICS 0
ZN 1060 POKE 752,1:REM Turn cursor off
UQ 1070 POKE 710,140:REM Background color
OW 1080 POKE 709,0:REM Text luminance
IX 1090 REM
LH 1100 REM Calibration data
VX 1110 LOTEMP=13.5:LOPADDLE=95
PS 1120 HITEMP=22:HIPADDLE=62
HT 1130 FACTOR=(LOPADDLE-HIPADDLE)/(LOTEM
    P-HITEMP)
VJ 1140 ? "     ATARI  Digital  Thermomet
    er"
WE 1150 ? :? "         PADDLE   TEMPERATUR
    E"
XU 1160 REM Main loop
WP 1170 T=PADDLE(2)
ZF 1180 GOSUB 5000
FM 1190 POSITION 10,5
UY 1200 PRINT T;
FF 1210 POSITION 20,5
RU 1220 PRINT INT(TEMP*10+0.5)/10
QN 1230 GOTO 1160
QZ 5000 REM ----------------------------
            >  Convert PADDLE value to <
EP 5010 REM >  temperature - degrees C.<
DK 5030 REM >  Calibration data:       <
AC 5050 REM >    temperature  paddle   <
DV 5060 REM >      13.5          95    <
UR 5070 REM >      22            62    <
PD 5090 REM >  T is paddle value       <
JI 5100 REM >  TEMP is temperature in  <
            >  deg C                   <
            ----------------------------
MZ 5120 TEMP=LOTEMP+(T-LOPADDLE)/FACTOR
AO 5130 RETURN
```

Next, put the thermistor in a cool place along with a thermometer, centigrade or fahrenheit, whichever scale you wish your program to use. After a few minutes, when readings have stabilised, note the thermometer reading and the paddle value. Give these values to variables LOTEMP and LOPADDLE. Move the thermistor and thermometer to a warm place and repeat the procedure, giving values to HITEMP and HIPADDLE. The device has a negative temperature coefficient so that when the temperature rises the resistance and paddle value fall. These four variables are used to calculate the change in resistance per degree, which is stored in the variable FACTOR. See lines 1100 to 1130 of listing 1. The above variables are used in the conversion subroutine shown in listing 1 at line 5000.

Reading the temperature in your own programs is very easy. You simply need to get the value of PADDLE(2), and change it to degrees centigrade with the conversion subroutine. The program in listing 1 does this and continuously displays both the paddle value and temperature on the screen. Hopefully you can think of a more imaginative application.

As mentioned earlier any device with a variable resistance may be used, and another very simple project is to connect up a light dependant resistor (LDR). This could then be used, for example, to detect the breaking of a beam of light falling on the LDR and then sounding an alarm, or to count objects passing in front of it. ●

## FORKLIFT from page 58

```
KX 3998 REM
KQ 3999 REM *** GR. 8 ROUTINE ***
AN 4000 DIM A$(257):RESTORE 4010:FOR J=1
    TO 257:READ A:A$(J,J)=CHR$(A):NEXT J:A
    ADR=ADR(A$):RETURN
FL 4010 DATA 216,104,104,104,133,203,104,
    104,133,204,169,0,133,205,6,204,38,205
    ,6,204,38,205,6,204,38
WF 4020 DATA 205,165,204,24,101,88,133,20
    6,165,205,101,89,133,207,6,204,38,205,
    6,204,38,205,165,204,24
VX 4030 DATA 101,206,133,206,165,205,101,
    207,133,207,165,206,24,101,203,133,206
    ,141,133,6,165,207,105,0,133
YX 4040 DATA 207,141,134,6,104,133,213,10
    4,133,212,104,104,141,129,6,206,129,6,
    104,104,141,131,6
YI 4050 DATA 169,0,141,132,6,141,130,6,16
    9,0,141,128,6,172,130,6,177,212,16,5,2
    06,128,6,41,127,201,32
WF 4060 DATA 176,5,24,105,64,16,7,201,96,
    176,3,56,233,32,133,204,169,0,133,205,
    133,208,6,204,38
HE 4070 DATA 205,6,204,38,205,6,204,38,20
    5,165,205,24,109,244,2,133,205,164,208
    ,177,204,77,128,6,172
UU 4075 DATA 132,6,145,206
VC 4080 DATA 230,208,165,208,201,8,240,15
    ,165,206,24,105,40,133,206,144,227,230
    ,207,208,223
UB 4090 DATA 144,160,238,132,6,238,130,6,
    206,129,6,48,43,173,132,6,205,131,6,20
    8,22,169,0,141,132,6,24,173,133,6
BO 4100 DATA 105,64,141,133,6,173,134,6,1
    05,1,141,134,6,173,133,6,133,206,173,1
    34,6,133,207,24,144,200,96
```
□

# contact

**COMPLETE KIT FOR SALE:** Atari 400 48K with full stroke keyboard, 410 Recorder, 2 Joysticks, 2 Paddles, BASIC cartridge, Invitation To Programming, over a dozen original games and programs, Owners Basic Reference Manual, Easy Learning Basic Manual, 40 Personal Computing magazines, 20 C. & V.G., 4 ANALOG, 3 ANTIC and the first 7 issues of PAGE 6. Plus assorted Atari info. Selling complete. Any reasonable offers. Tel. 0785 40316

**SWEDISH PEN PAL:** As I don't have any Atari owning friends here in Sweden, I would like to get in touch with other users around the world. (Aven svenskar ar valkomna att skriva!). I have an 800XL, 1050 Disk Drive, 1010 Cassette and Seikosha SP-1000AS printer. I am very pleased with my system and hope you are with yours! I look forward to hearing from you! Please write to: Christian Magnusson, Buntmakarvagen 76, S-141 73 Huddinge, Sweden.

**ANALOG REQUIRED:** Issues 27, 36,37 and 38 required. Also FOR SALE - Mapping The Atari (early edition) £5. Phone F.H.Duggins on 0395 278183

**PEN PALS AND MORE:** I would like to get to know some PAGE 6 readers. Please write. Also I have for sale a 16k circuit board from my 400 plus the old 400 keyboard (offers please) and De Re Atari in brilliant condition for just £12. Cookie Malik, 39, Marlborough Road, Southall, Middx, UB2 5LW. Tel. 01 571 4484 and ask for Cookie.

**410 RECORDER:** Gradually refused to load, it might be useful for spares or for someone with the know how to fix it. £10. Write to Nick, 2, Ambleside Road, Whitby, Ellesmere Port, South Wirral, L65 9DQ

**SANDS OF EGYPT:** Can anyone tell me where I can obtain this game from! Also, how do you access those lined patterns in Micropainter at the top left of the screen? Please write to John Norris, 23, Weldon Road, Altrincham, Cheshire, WA14 4HF.

**600XL FOR SALE:** Complete with 64K RAM Pack. Sell for £100. For details contact Matthew Dyson. Tel. 021 360 2811

**PEN PALS WANTED:** From Ireland or all over the world. I own an 800XL and 1010 recorder. Also wanted - first 6 issues of PAGE 6. Paul O'Brien, Lougharbour, Athy, Co Kildare, Ireland. Tel. 0507 26224 (evenings). Monday to Friday.

**TARDIS BULLETIN BOARD:** Running on an Atari 800XL with 4 assorted drives and a WS3000 Modem. The board offers teleshopping facilities of any Atari related products and has a large amount of downloadable public domain software. Tardis operates on 0772 27236 from 18.30 to 09.00 Monday to Saturday and all day on Sunday at 300 baud. Give us a call. Sysops Jonathan Cunliffe and Brian Davies.

**BAUD MAGAZINE:** Belfast ATARI Users Digest. Send 18p with your name and address for issue 1. Alternatively, send £3.00 with name and address for six bi-monthly issues. Send to Frankie Smyth, 62, Orchardville Avenue, Finaghy, Belfast, BT10 0JH

**VOICE BOX II INFORMATION:** Can anyone give me the new address of Alien Group, retailer of Voice Box II? I have changed over to a 130XE and 1050 and the disk is not compatible even with a Translator. If anyone knows how to get a working disk I will swap De Re Atari! A.E.Raper, 22, Barnes Road, Darlington, Co. Durham. Tel 0325 52805

**1027 POWER ADAPTER:** Never used. £6. Contact Conrad Hancock, 17, Victor Street, Darranlas, Mountain Ash, Mid Glam. CF45 3LG. Tel. 0443 474299

**THE PAYOFF:** I am in desperation. Can anyone tell me where to go from the costumiers once you have taken the money from the till? Contact Conrad Hancock, 17, Victor Street, Darranlas, Mountain Ash, Mid Glam. CF45 3LG. Tel. 0443 474299

**PEN PAL WANTED:** In UK or U.S.A. with views on swapping hints and programming. Contact Vincent Campion, Lisduff, Errill, Portlaoise, Co. Laoise, Ireland.

**ZORRO:** How do I complete the game? I've got every item I can but can't find anything underground! Please help. John Norris, 23, Weldon Road, Altrincham, Cheshire, WA14 4HF.

**FROM OREGON, U.S.A.:** Atari User Group members from Portland Atari Club would like to communicate with users from UK or other countries. We would enjoy exchanging Public Domain disks or other information on all phases of computing. Lee Bole and Margaret Manning, 2515 N.E. 41st Ave., Portland, Oregon 97212, U.S.A.

**COMPUTER ANIMATION PRIMER:** Plastic bound. Mint condition with disk or cassette of programs. £13.50 o.n.o. Matthew. Newhaven 513671

**822 PRINTER:** 822 Thermal printer for sale. Best offer secures. Colin Friston, 35, Lansdowne Road, West Ewell, Epsom, Surrey, KT19 9QJ

**DEVON AREA:** Any one out there!! I would like to hear from you. I have an 800/130XE with 810/1050 disk drives and a printer. I enjoy programming and chatting!. Ken Hall, 'Lyndhurst', Prospect, Okehampton, Devon, EX20 1JD. Tel. 0837 2565

**48k RAM WANTED:** I need an ATARI 400 48k RAM pack. I will trade in my existing 16k RAM pack plus some original software. Laurence Rimington, 28, Fernhurst Road, Alum Rock, Birmingham. Tel. 021 328 4980

**PEN PALS WANTED:** I would like to make contact with ATARI users around the world, especially AMERICA. I have a 800XL and 1050 disk drive. Please write to Fred Weilenman, Domela Nieuwenhuisstraat 21 I, 1069 8K Amsterdam, Netherlands.

**CONTACT really does work! If you need help or want to get in touch send your notice to PAGE 6 on a seperate sheet of paper headed CONTACT. We will accept any notices from private individuals except those offering software or copying utilities for sale or exchange. There is no charge.**